Simple Aids for Daily Living

AHRTAG
Appropriate Health Resources & Technologies Action Group Ltd

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Simple Aids for Daily Living

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This book replaces the AHRTAG publications Low Costs Aids and Low Cost Physiotherapy Aids, containing material from these books as well as a range of new material.

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COMMUNITY HEALTH CELL
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Bangalore - 560 001.

before making any aids
it is important to read this information

This book shows how to make simple aids for sitting and walking.

The aids can be used in hospital or at home.

It is important that whoever chooses the aid understands the right treatment for each medical condition. The maker must work closely with a medical adviser so that they can adapt aids to suit each person.

* MAKE EACH AID THE CORRECT SIZE FOR THE USER.

* IF THE AID IS TOO LARGE OR TOO SMALL, THE AID WILL NOT HELP.

* YOU CAN SEE THE CORRECT MEASUREMENT BY LOOKING AT THE PICTURES.

* MAKE SURE THE PERSON IS TAUGHT HOW TO USE THE AID AND DOES NOT FALL OVER AND INJURE HER/HIMSELF.

* THE AID MUST NOT RUB OR PRESS ON THE SKIN. YOU MUST BE VERY CAREFUL WITH PEOPLE WHO HAVE NO FEELING IN THEIR SKIN, AS WITH LEPROSY.

* MAKE SURE THE AID IS COMFORTABLE TO USE.

* SMOOTH ALL ROUGH SURFACES AND REMOVE ALL SHARP CORNERS AND EDGES.

* MAKE SURE THAT ROPES AND TIES ARE SMOOTH AND DO NOT CUT INTO THE SKIN.

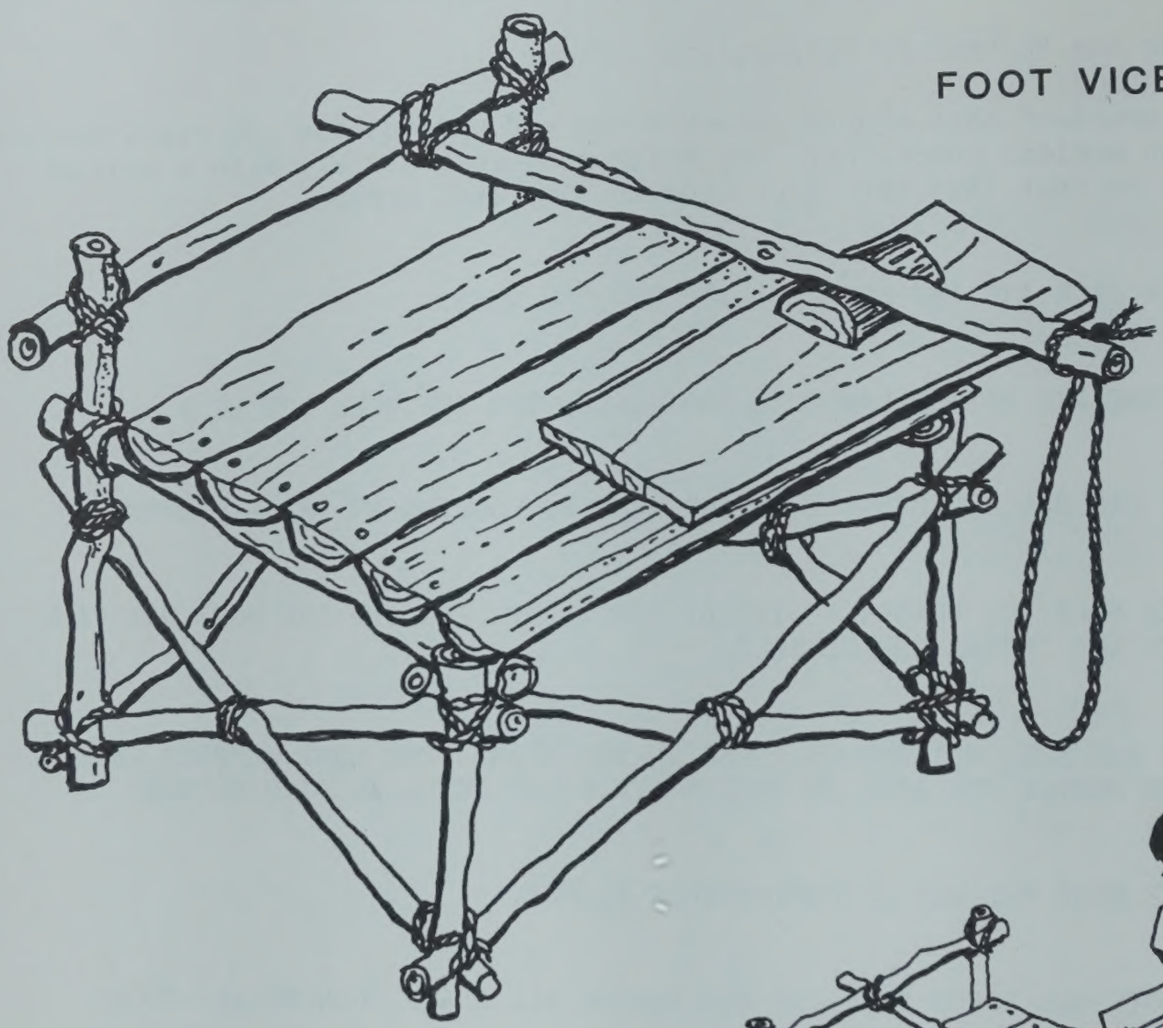
You can make all the aids in this book using local skills and materials which means that the aid will be more easily available, low in cost and can be quickly repaired.

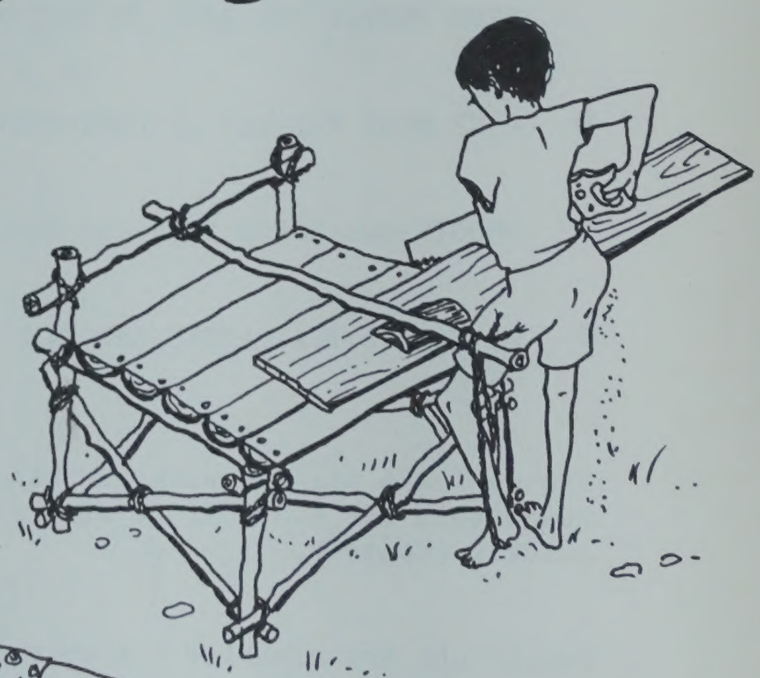
People who are disabled can make these aids. You can make foot and sitting vices to help them hold the wood firmly in place while they work.

this vice helps enable handicapped people to make the aids in this book

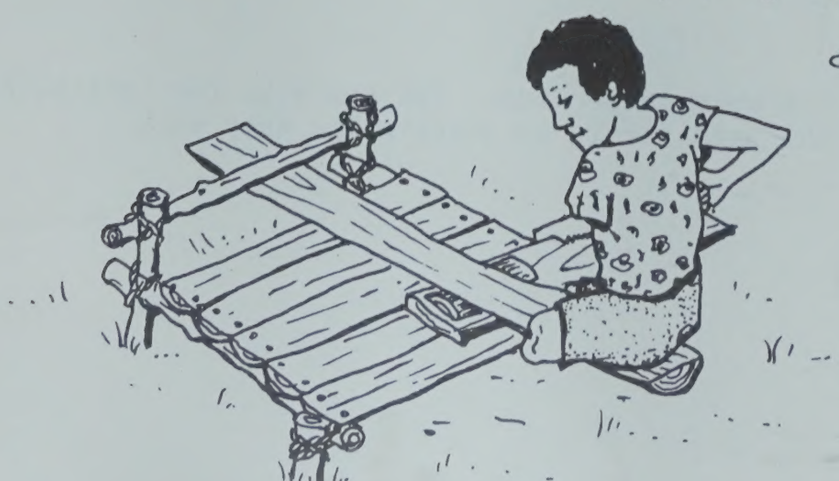
VICES TO HELP THEM HOLD THE WOOD FIRMLY IN PLACE WHILE THEY WORK

FOOT VICE





SITTING VICE

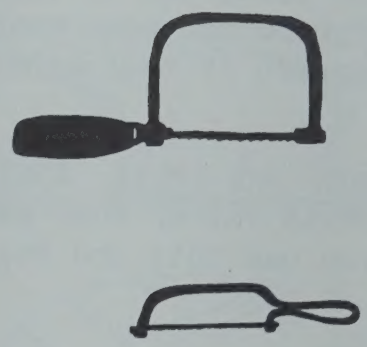


hints on making the aids

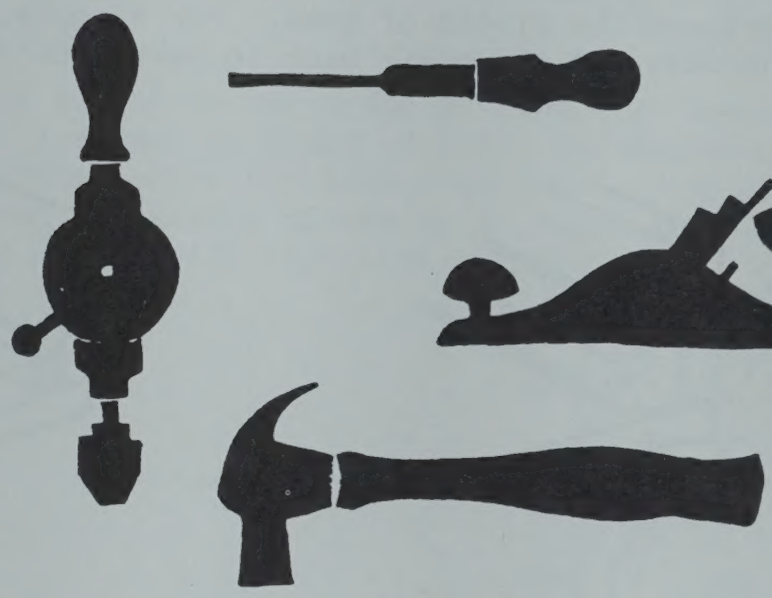
TOOLS

You only need seven tools to make all the aids:

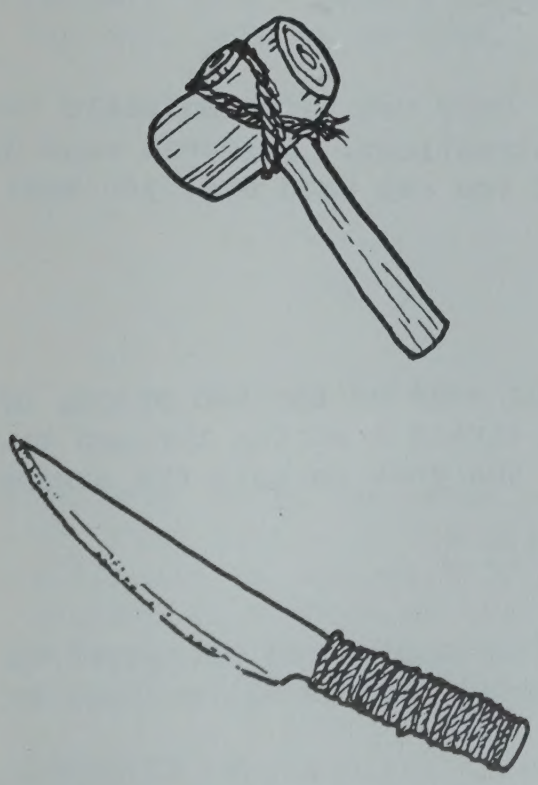
* three saws - handsaw, coping saw and junior hacksaw

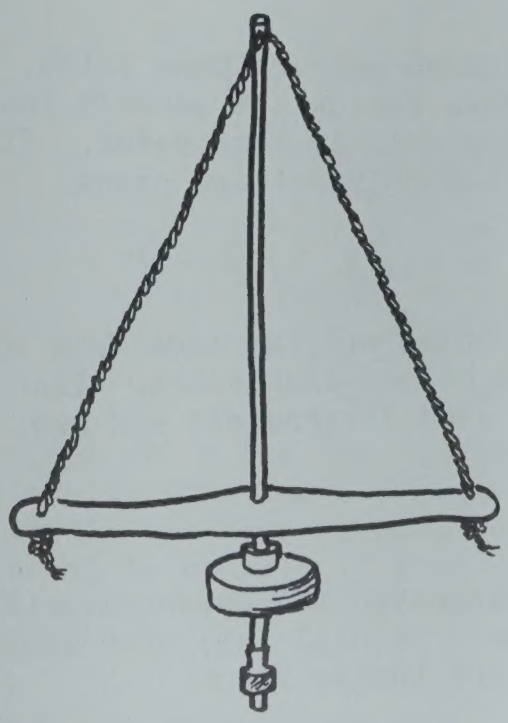


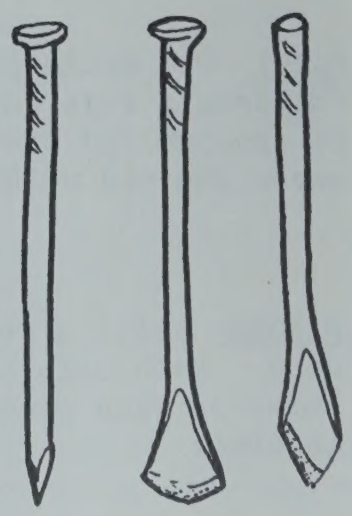
* one screwdriver
* one plane
* one hand drill
* one hammer



You can make your own wooden hammer and bow drill. You can make chisel and drill bits with nails.





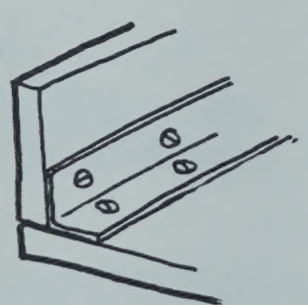


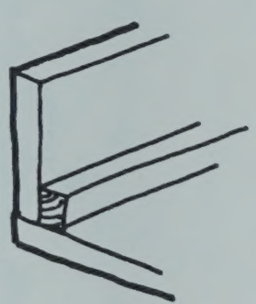
materials

WOOD Softwood is often cheap and easily available. Wood from shipping crates and boxes can be used. Plywood is useful for chair backs and seats. Ordinary plywood can come apart when it is wet. Therefore, only use it when you have covered it thoroughly with polyurethane paint.

NUTS AND BOLTS Roofing bolts are good as they do not rust. Use nuts and bolts rather than nails or screws. You can then adjust parts of the aids. If you use nuts and bolts do not use any glue.

JOINING TWO PIECES OF WOOD TOGETHER You can do this with one inch (25mm) aluminium or iron angles, or one inch x one inch (25mm x 25mm) softwood. When you are putting the pieces of wood together to make the aid, leave gaps where possible between the pieces of wood. For example, a gap should be left between the seat and the chair back to make cleaning easier.





GLUE Urine can get into the joins in the wood of chairs. The wood then becomes dirty and smells. Glue all surfaces to be joined with a waterproof glue, e.g. the glue boat-builders use. You can then wash the aid. All joins should fit well so that dirt will not be trapped between the pieces of wood.

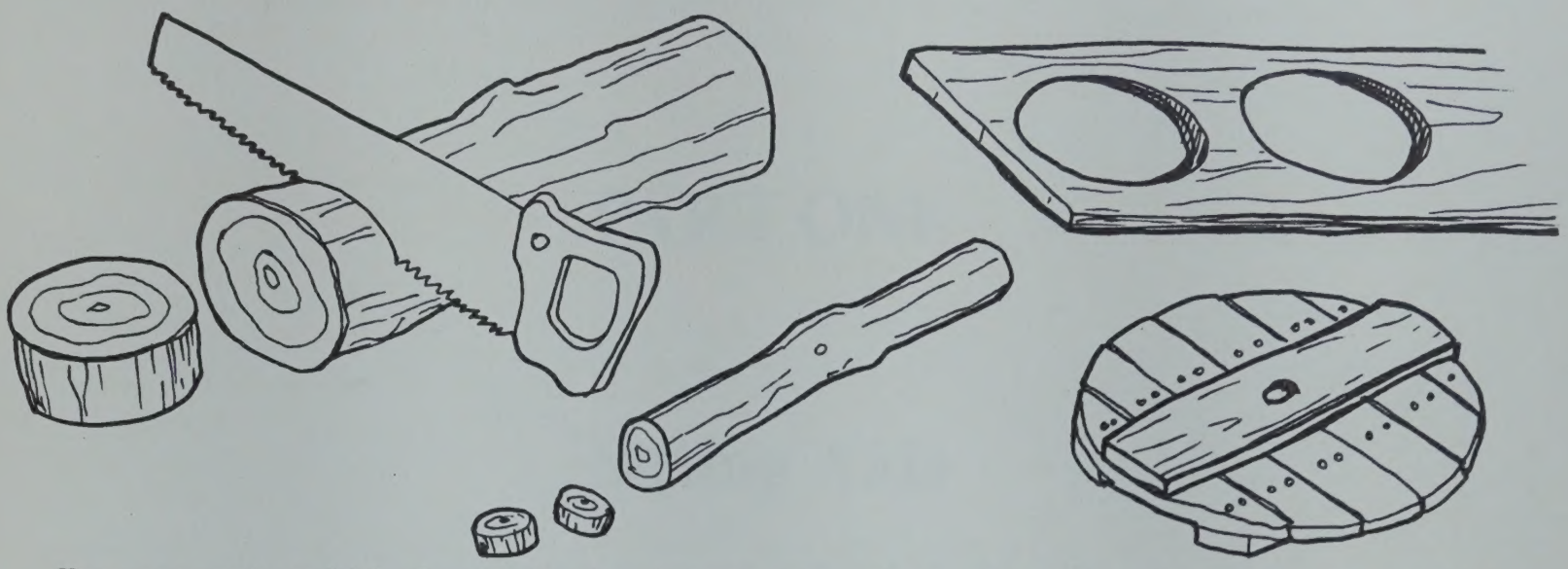
PAINT Use brightly coloured polyurethane paint. Only use paint suitable for children's toys and always follow the maker's instructions. Coloured wood dye is cheaper and dries more quickly than paint. If you use wood dye, you must cover the aid with a clear polyurethane paint.

HINGES Drill a row of holes half an inch from the edge of the two pieces of wood. Each hole should be one inch apart. Then thread a string through the holes on each piece of wood alternately and knot the ends to hold the string in place.

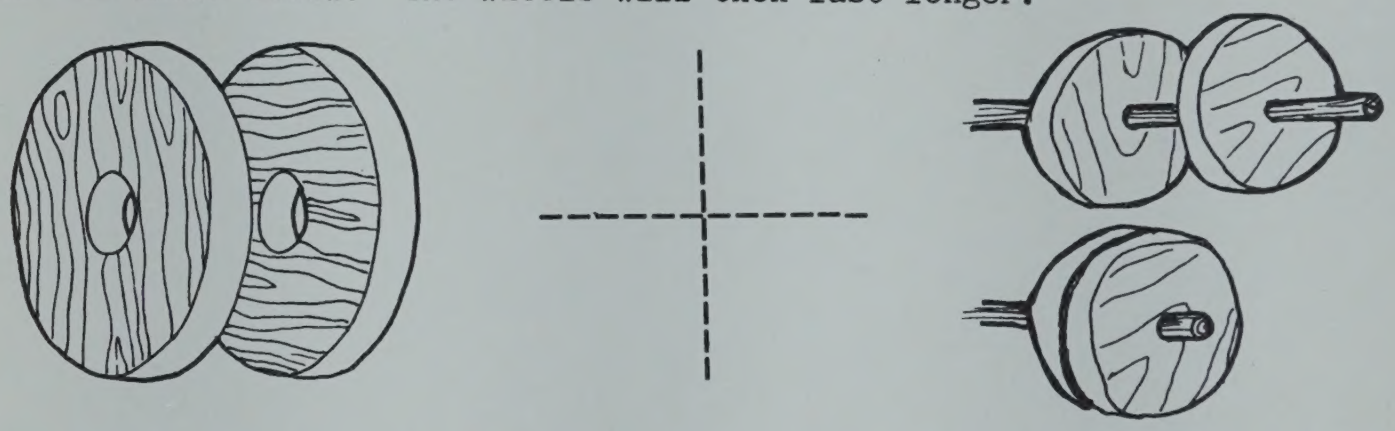
SANDPAPER Plane and sandpaper the surfaces. (Glue a piece of sandpaper on to a board or flat surface - it will last much longer.) Remove all corners on which children could hurt themselves.

WHEELS

SOLID WOOD WHEELS Solid wood wheels are best for mud and sand. If a wheel has spokes, the mud and dirt will get between them and stop them working properly. If you fit a mudguard it should be at least four inches above the wheel. Otherwise dirt will be trapped between the wheel and the mudguard.

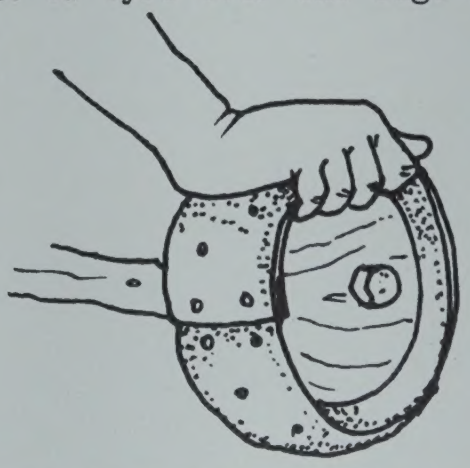


You can cut solid wheels by hand from any piece of wood. It does not matter if they are uneven if they are used on rough ground. The minimum width of a wooden wheel is one inch (25mm). Use two layers of wood. Glue and then nail them together. The grain of the layers should be at right angles to each other as shown below. The wheels will then last longer.



Fix wooden wheels to the aid with nuts and bolts, screws or an axel.

You can nail pieces of old car tyres to the rims of the wheels. This will protect them. Always leave a bit of tyre over the edge of the rim. The child can then hold on to this.



CASTORS These are often expensive to buy and difficult to obtain, but if they are used then only use castors on the aids for older children as they can be difficult to control. If an aid has four wheels, two of the wheels may be castors (i.e. both at the front or back). If four castors are used on a walker, two should be fixed with string. If you make a three-wheeled aid, only the front wheel should be a castor.

COCONUTS Drill right through the coconut and push an axel through the holes. You can fill the nut with cement mixture and fibres to make them last longer.

NOTES

PART ONE

Sitting Aids

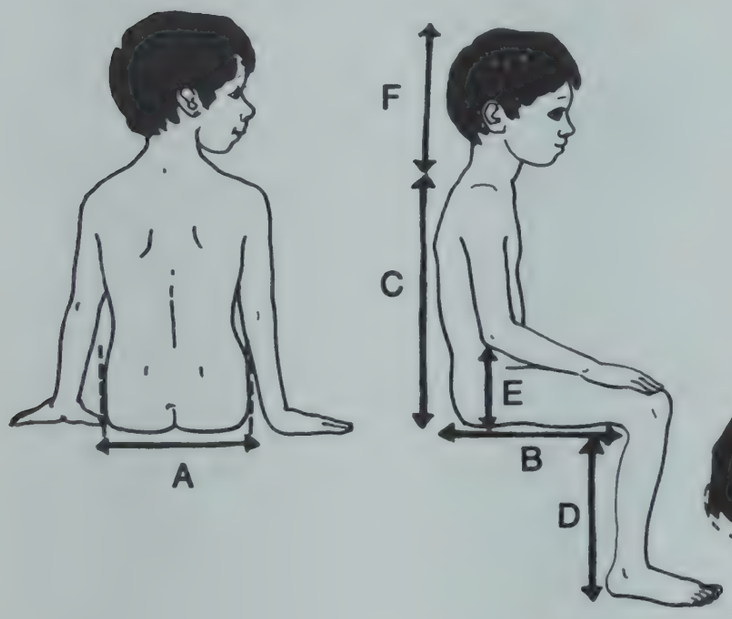
HOW TO MEASURE FOR CHAIRS OR SEATS

First of all decide what type of seating will best suit the disabled person's needs, and determine exactly how much support is needed - to back, neck and head, arms and feet. It would be best to consult a medical adviser about this.

If the person can sit up, place him/her in a chair with a straight back.

Use a cloth tape measure or, if that is not available, a piece of string or rope. Always measure along a straight line. Do not measure along the contours of the body for chair size.

Note Remember to leave enough space for padding if this is needed.



A. The width of the seat

Measure the person across the widest part of the hips while he/she is sitting down. Then add one inch (25mm) to this measurement to obtain the width of the seat. (This should be the same as the width of the chair back at the shoulder).

B. The depth of the seat

Measure the person from the back of the seat to the back of the knees. Take off about one and a half inches (35mm) from this measurement, to obtain the depth of the seat. This is so that the seat does not come right up to the back of the knees, which can be uncomfortable and cause pressure sores. Remember that most people do not sit straight upright - certainly you need to allow for this.

C. The height of the back

Measure from the base of the seat to the top of the shoulders. (Unless the medical adviser recommends otherwise, the person should be encouraged to support him/herself from the waist upwards).

D. The height of the chair to ground

Measure from under the knees to the bottom of the heels. If footrests are to be used, these must be taken into account in the measurement.

E. Armrests

Measure from the elbow to the seat, and extend far enough to support the hands if necessary.

F. Headrest

These may be added to the backs of chairs. Measure from the shoulders as shown.

how to make the aids more comfortable and avoid pressure sores

No padding has been shown on the drawings, so that you can see more easily how to make the aids. However, it is important to pad any surfaces or edges which may rub parts of the body. A cushion on the seat is essential for anybody who is going to sit for any length of time. Pressure sores come quickly and are very difficult to treat. They quickly become infected.

Cushions or padding may be made by filling sacks or polythene bags loosely with wood shavings or sawdust, leaves or dried grass or other padding materials. If the bags are too full, they will be uncomfortable.

The cushion should be removeable and covered in a material which is easy to wash and which should be stretched tightly across the cushion. Creases may rub the skin and cause sores.

To seal polythene bags, put the open end of the bag between two pieces of wood with 1/8 inch (3mm) of the bag sticking out. Hold the wood tightly together. Run a small flame quickly across the two edges you want to seal. Make a few holes in the edges of the bag to stop the bag bursting.

Sacks You can also use old sacks for chair backs and seats. If you do this, leave a gap of at least three inches (75mm) between the seat or ground and the back of the chair. Then the chair back will not become wet from urine.

Adjustments to the aids You should make as many parts of the aid adjustable as possible, (such as the head rest, foot rest, arm rest, angle of the back and height of the seat). You can do this by either:

* a series of holes drilled at regular intervals and held together by nuts and bolts or wood screws. Do not use glue.
  Or
* slots which should be at least two inches long. The slots should be a good fit for the bolt or the head of the bolt will slip through.

Head rests If the child does not have head control he may need a head rest with sides. The sides should not be so large that they stop the child from seeing properly. You must make a head rest that can be adjusted up and down. Use at least a half inch (12mm) of padding to protect the head and ears.

Foot rests These are mainly used on mobile chairs

Foot boxes The feet can be put in boxes to prevent too much movement and the damage which this can cause. Make sure the box is large enough. Pad the inside of the box.

You can glue sandpaper on to the foot rest to give more grip. You can also sprinkle sand on glue or wet paint.

Pommels Pommels are used to keep the legs apart. The pommel can either be of solid wood or hollow. They allow heat to escape which may otherwise cause sores. They stop the child sliding down the seat when you do not want to use a harness. If the pommel is hollow, toys can be put inside it. This may encourage the child to move her/his arms to get the toys out. Tins, bamboo and polythene bottles are especially suitable. Pad the pommel if desired.

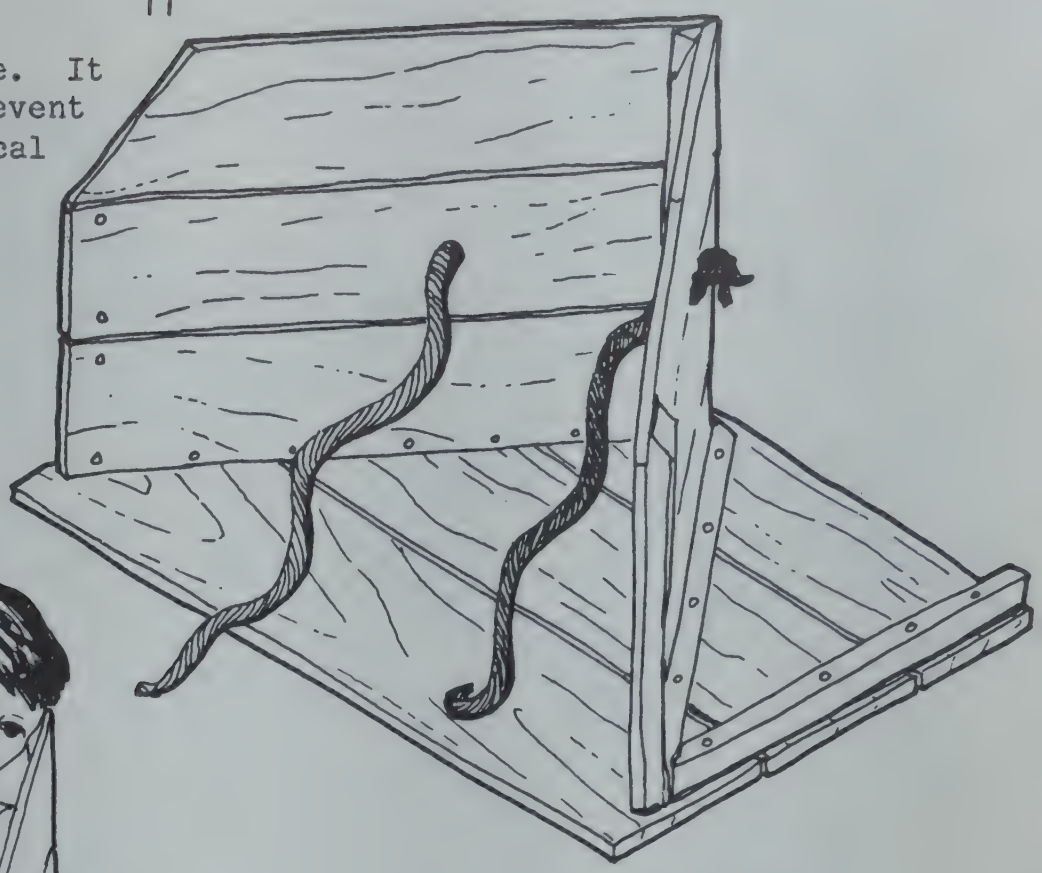
Harnessing The medical adviser must decide whether to harness the child and how this should be done. Incorrect harnessing can be dangerous.

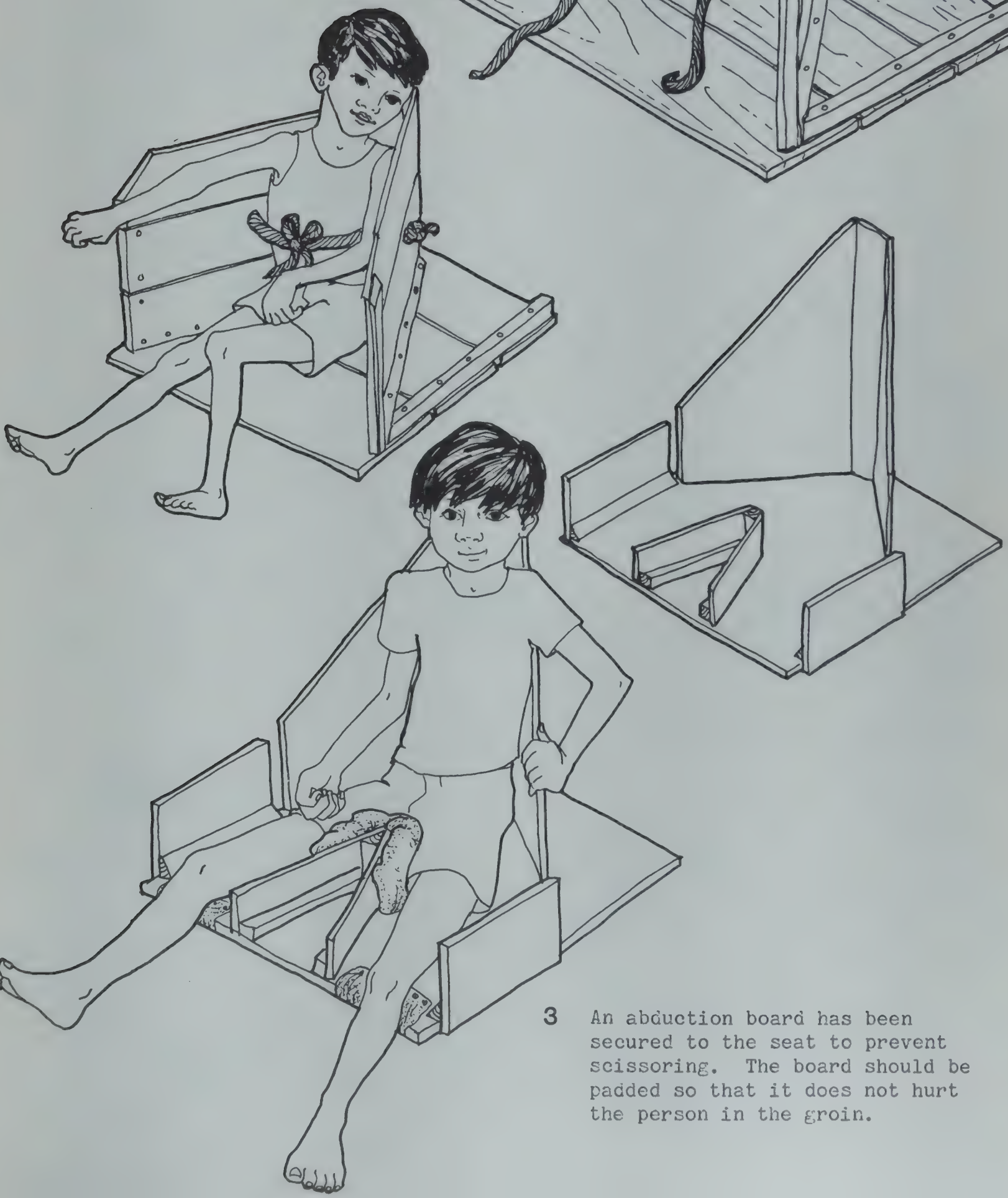
CORNER SEATS

These seats can provide stability and security for a child with poor sitting balance.

1 Here wooden posts of an appropriate length are driven firmly into the ground. Posts placed in a V-shape between the legs help prevent scissoring. This seat allows a full flow of air and is especially useful in hot climates.

2 This corner seat is portable. It has a broad base to help prevent tipping. Check with a medical adviser before fitting a restraining strap.

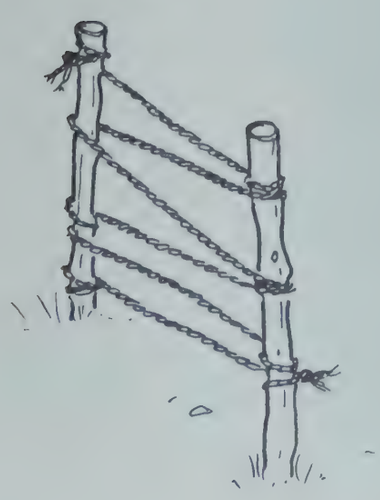




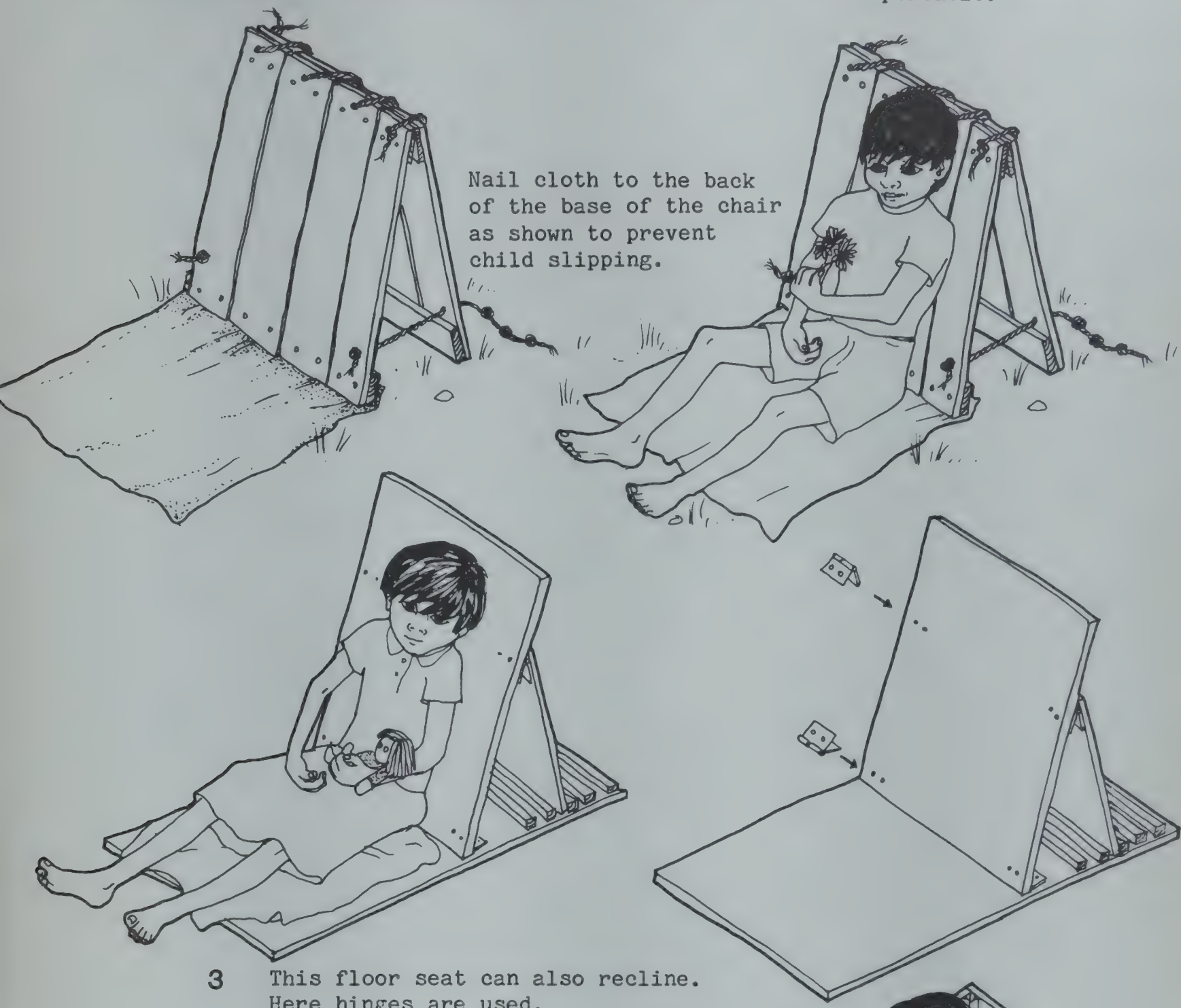
3 An abduction board has been secured to the seat to prevent scissoring. The board should be padded so that it does not hurt the person in the groin.

FLOOR SEATS

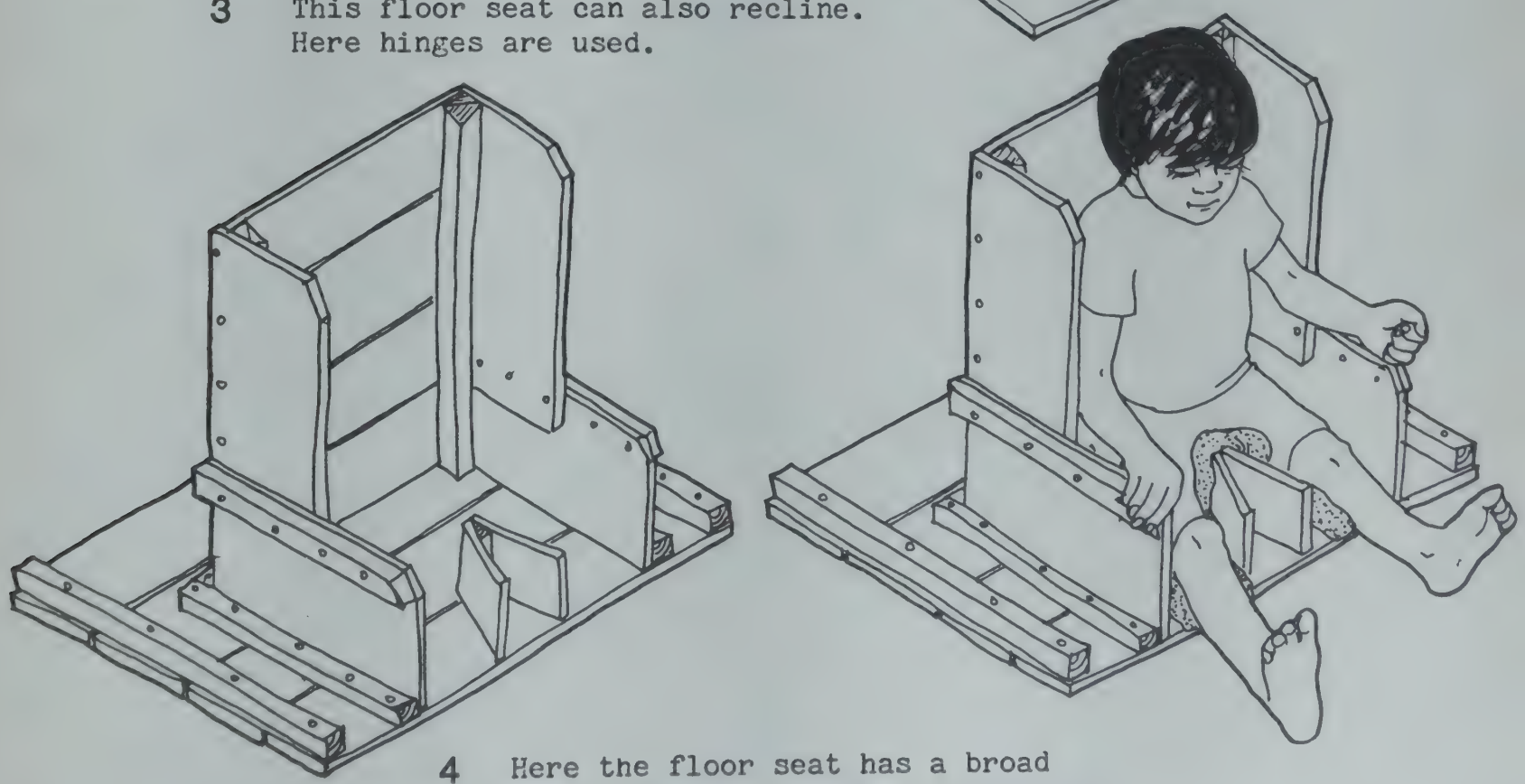
1 Covering the seat with material, or weaving grasses through the posts provides extra comfort.



2 Strong rope or twine threaded through the base of the floor seat allows it to be placed in a reclining position. This seat is also portable.

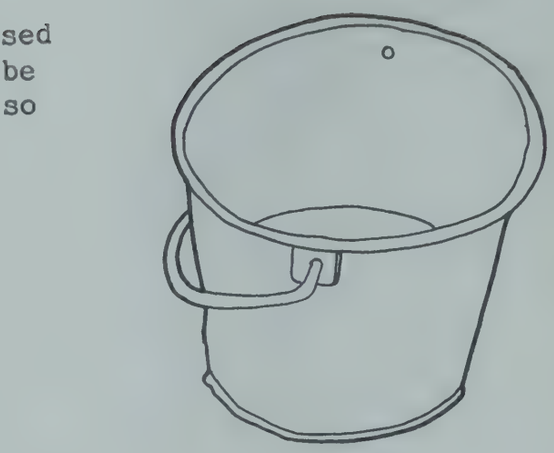


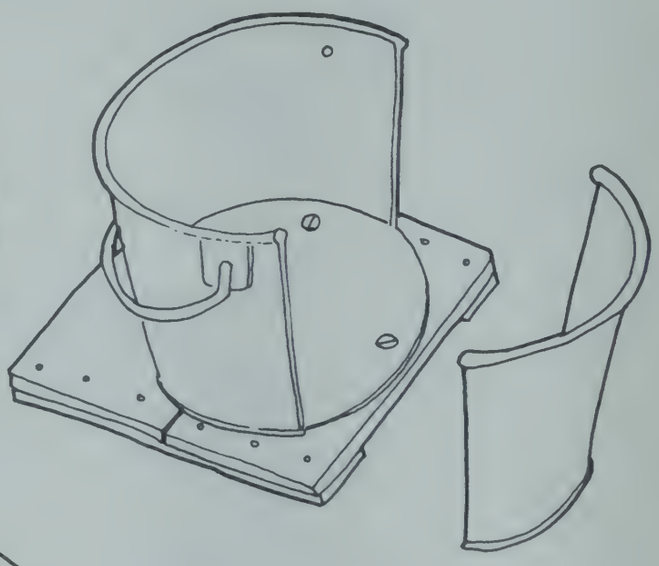
3 This floor seat can also recline. Here hinges are used.

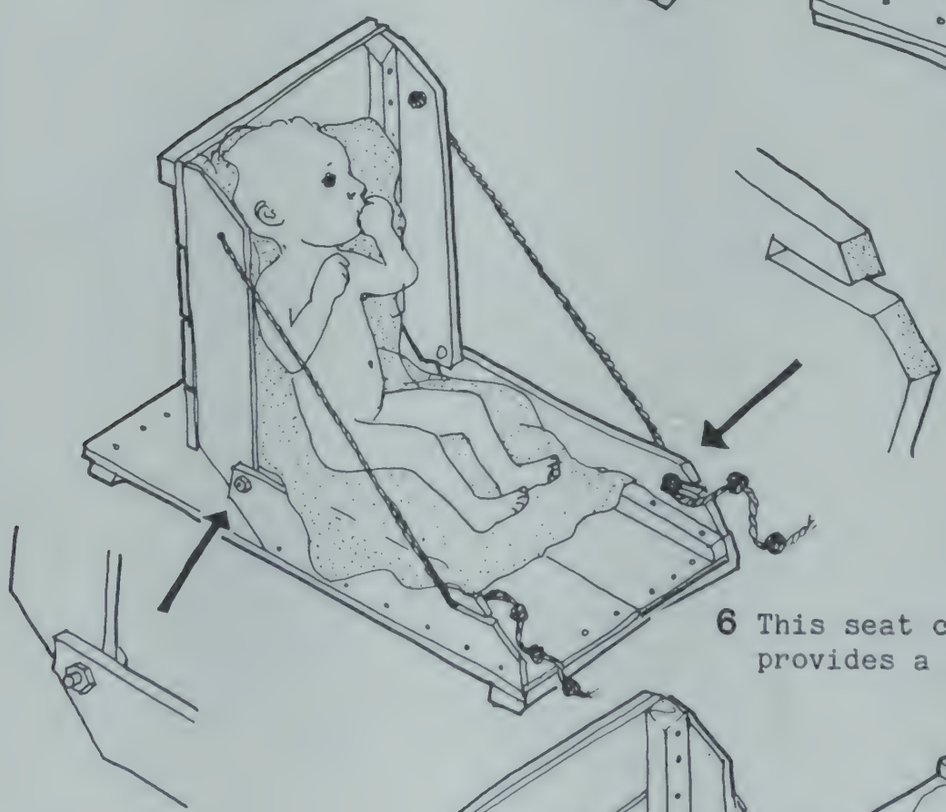


4 Here the floor seat has a broad base to make it stable. There are also arm rests and an abduction block.

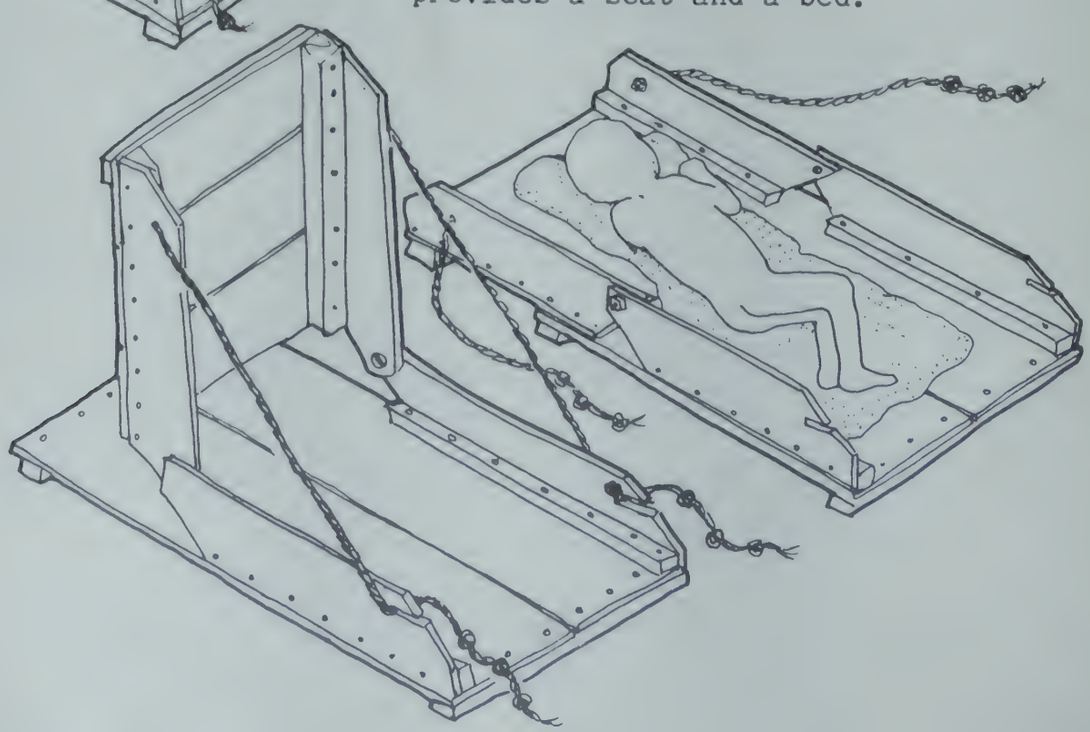
5 A plastic household bucket can be used to make a floor seat. Care should be taken to avoid any rough edges and so prevent injury.





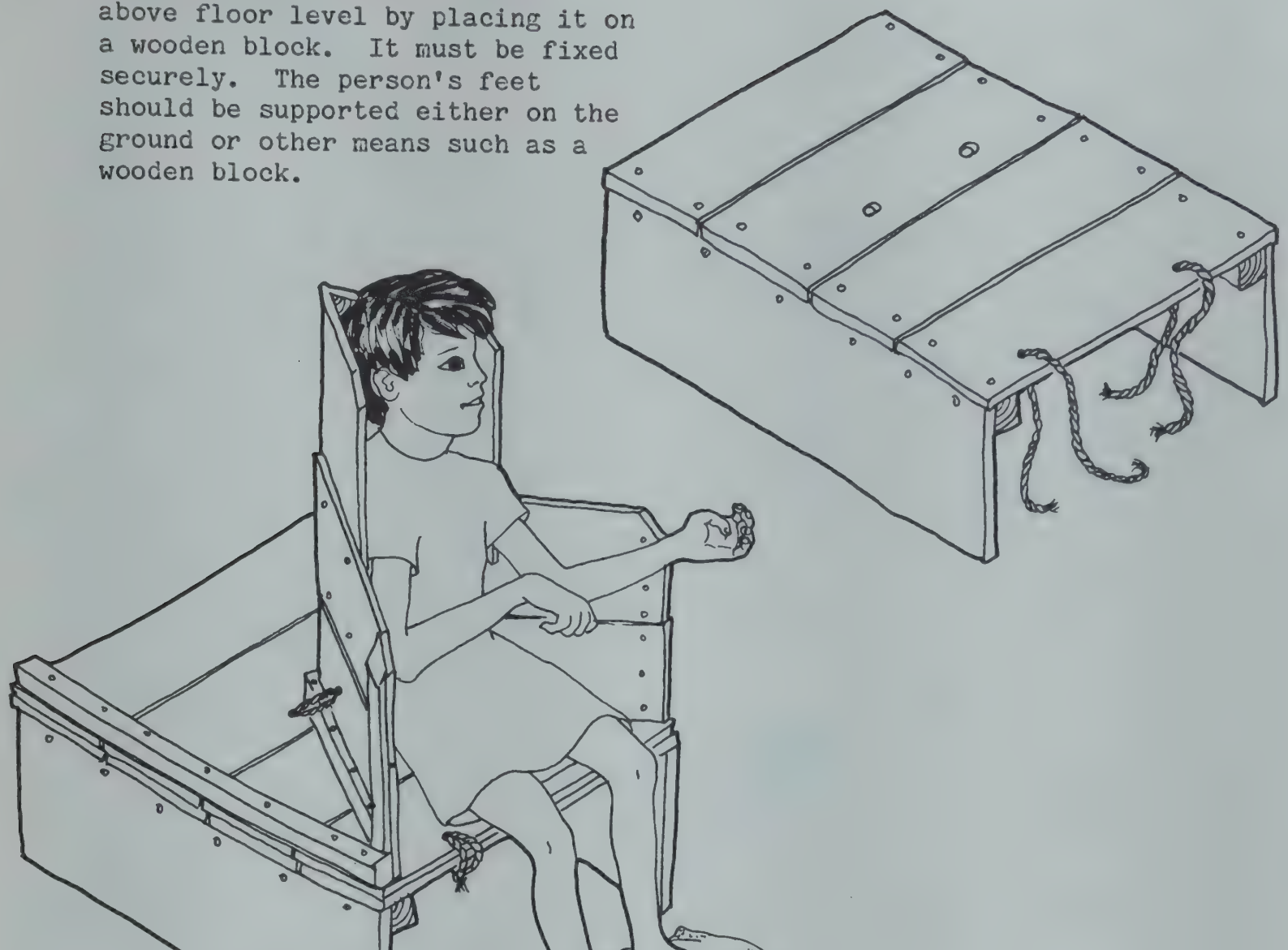


6 This seat can be fully reclined and so provides a seat and a bed.

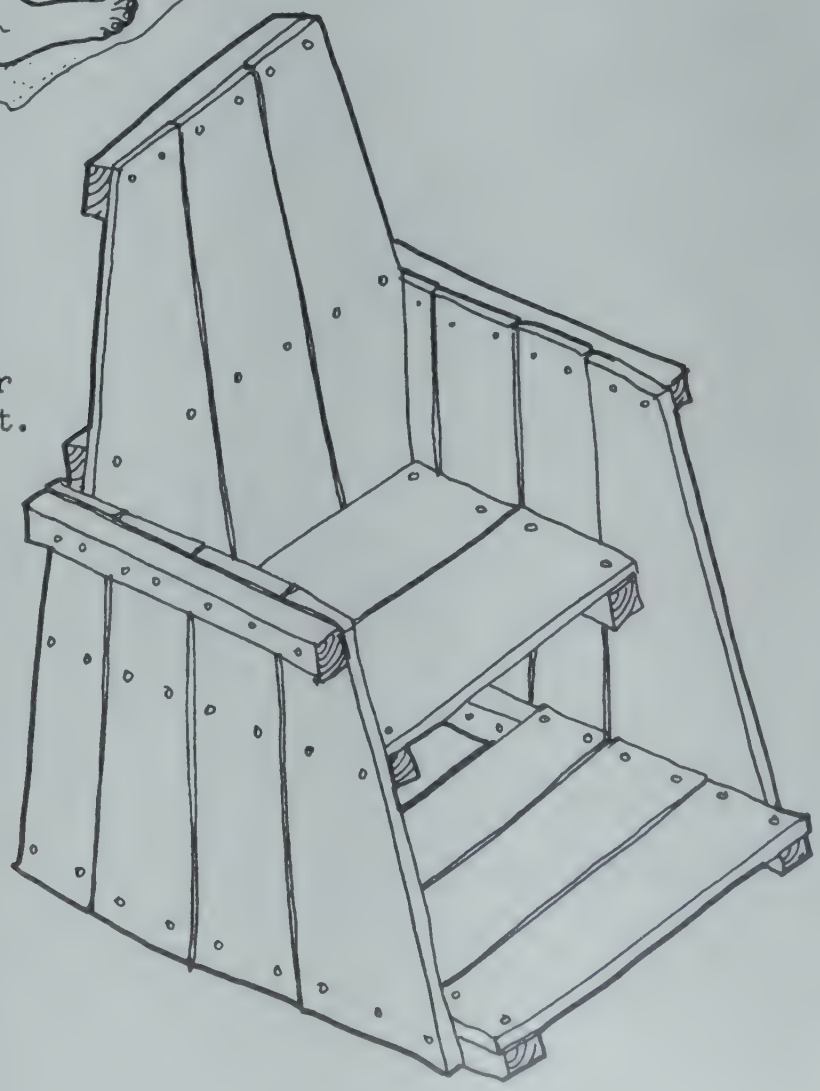


SITTING HIGH

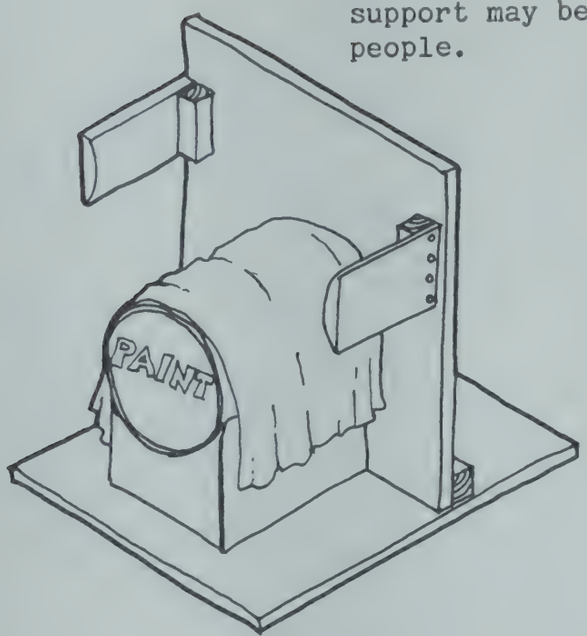
1 A corner seat has been raised above floor level by placing it on a wooden block. It must be fixed securely. The person's feet should be supported either on the ground or other means such as a wooden block.

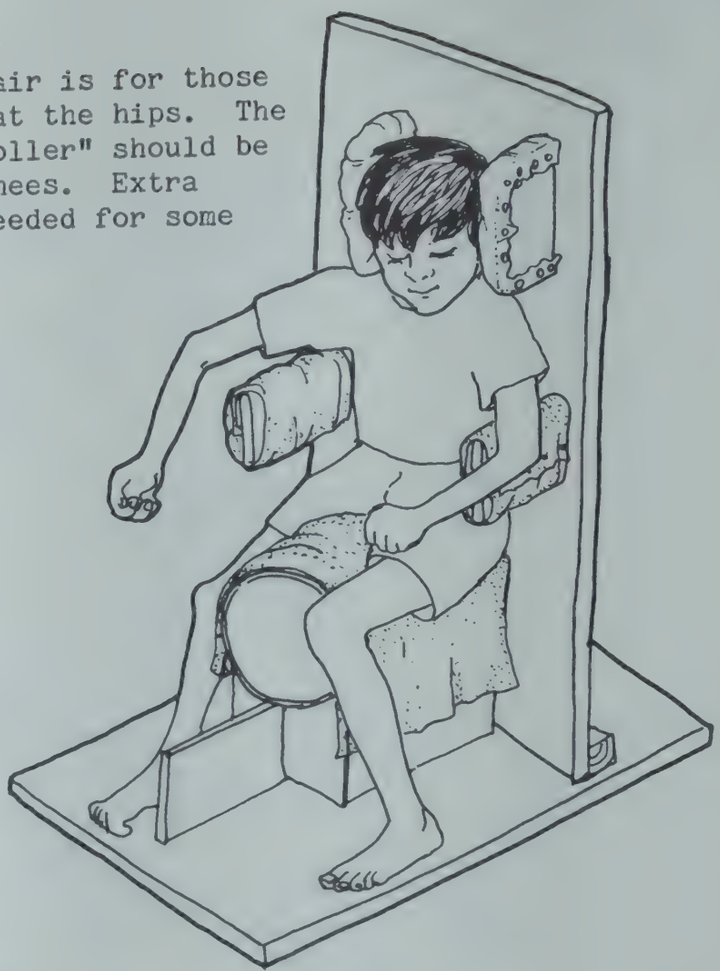


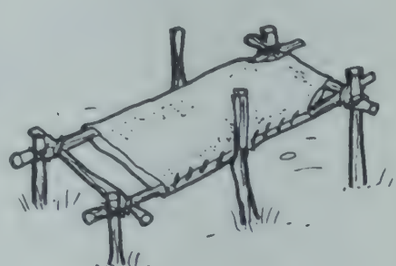
2 This chair provides support for the arms, the head and the feet.



3 The abduction chair is for those who cannot bend at the hips. The height of the "roller" should be level with the knees. Extra support may be needed for some people.



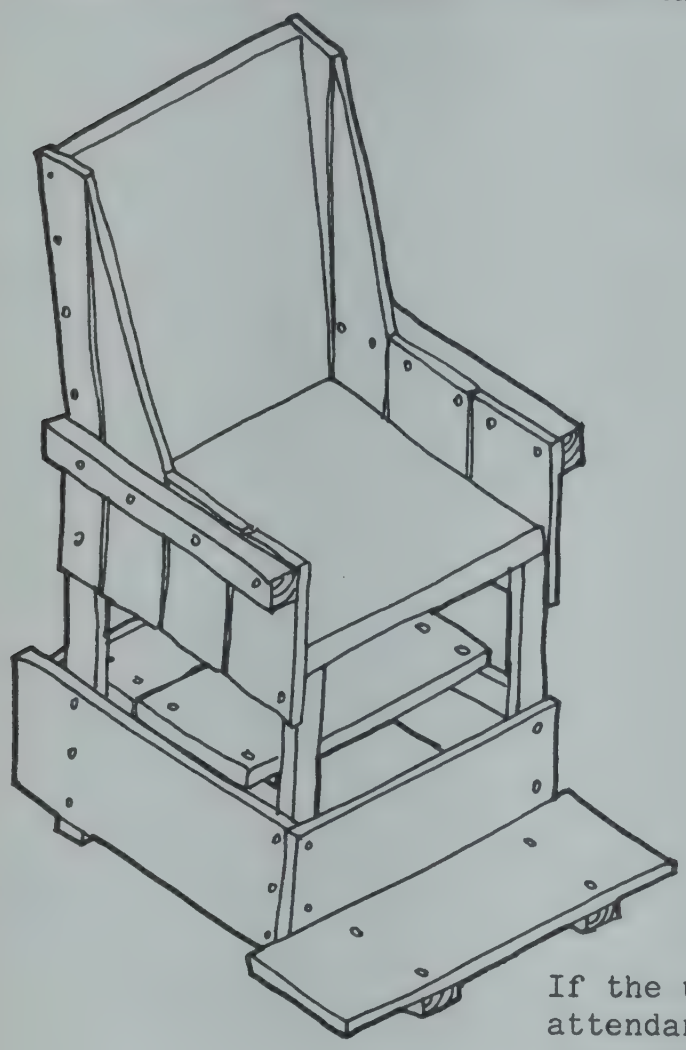


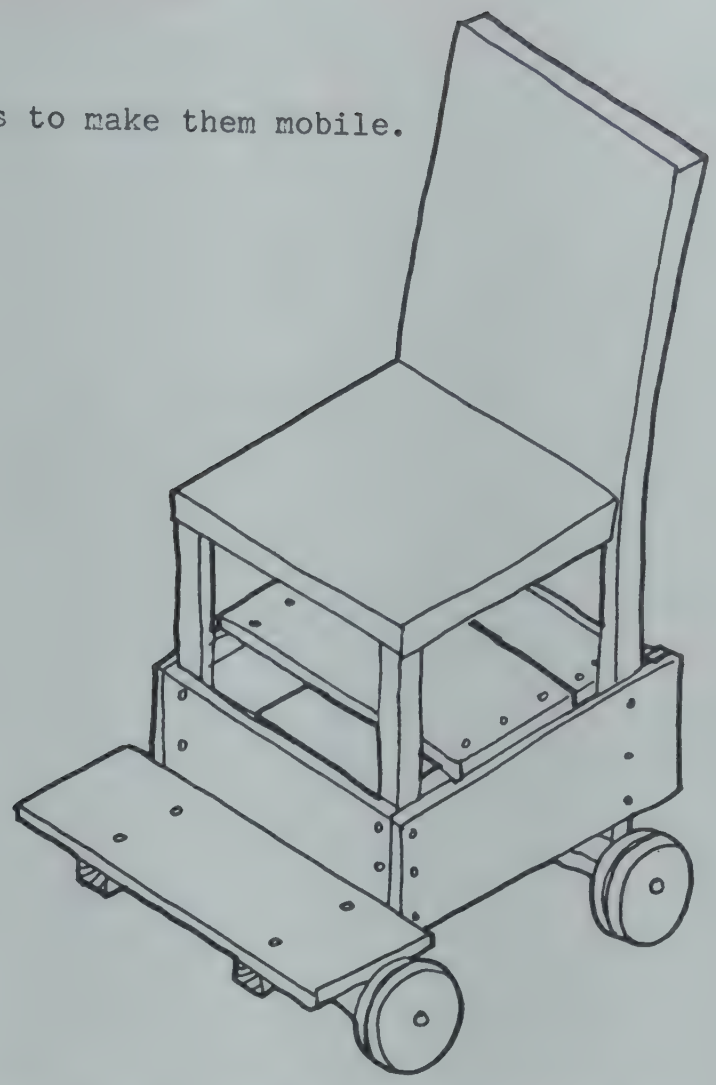


4 A removable back support means that a chair can be converted into a bed.

MOBILE CHAIRS

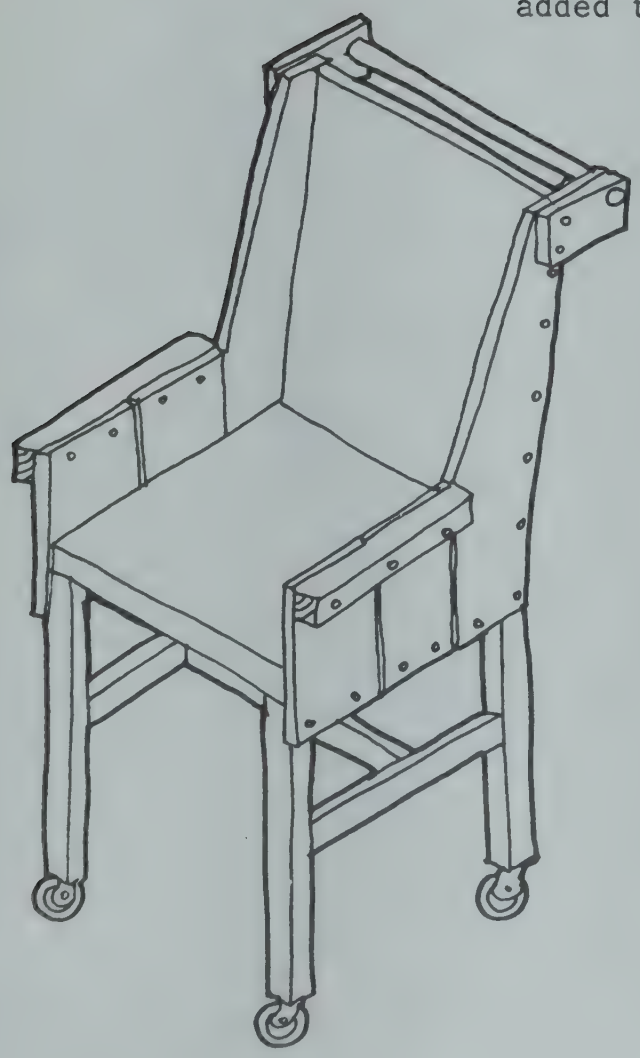
Wheels have been added to these chairs to make them mobile.





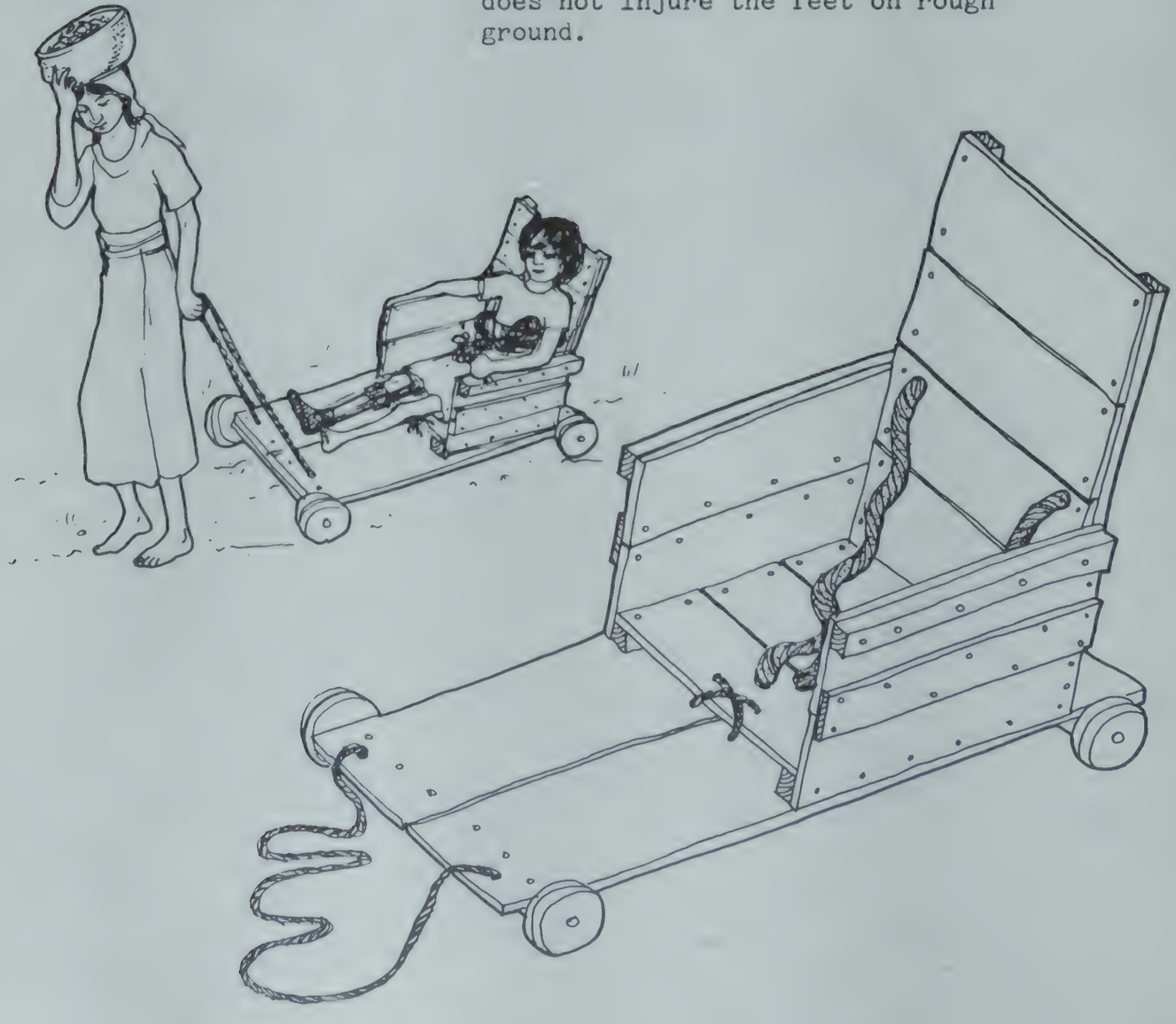
If the user is to sit in the chair without an attendant, then you must make sure that the chair is secure and will not roll away.

Unless the user is very stable, side supports must be added to prevent them from falling out.



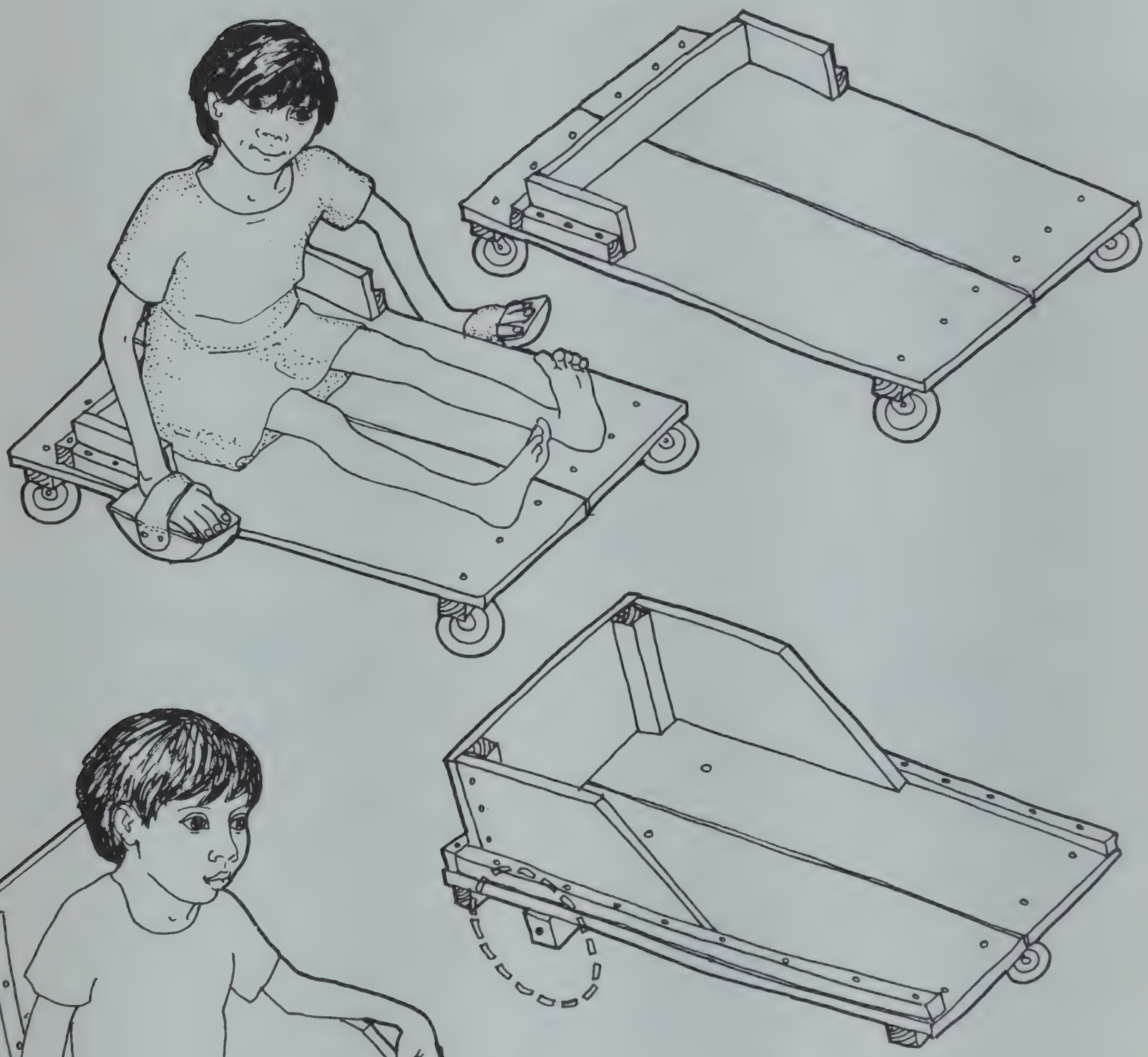
MOBILE CHAIRS

Care must be taken so that the person does not injure the feet on rough ground.

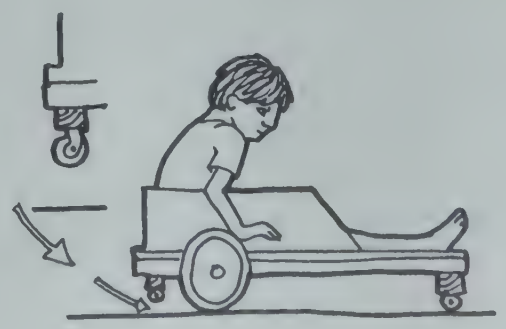


SELF-PROPELLED TROLLEYS

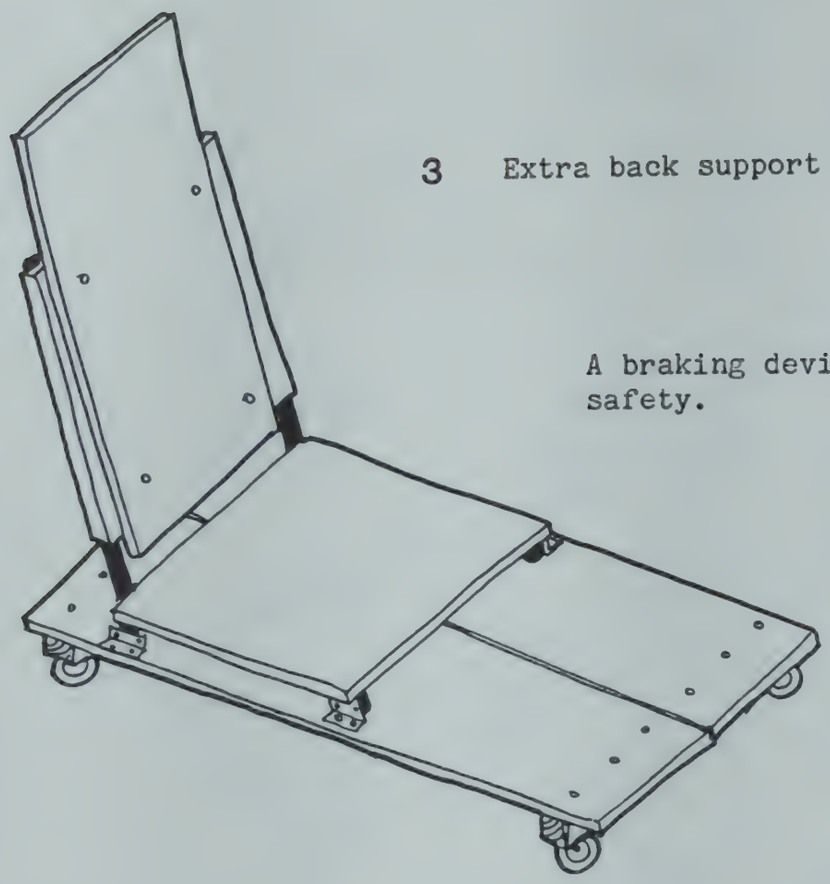
1 This little wooden trolley enables the users to transport themselves over short distances using their hands. Protection for hands may be needed if the ground is rough. As there is no back support the user must have good trunk control. A braking device may need to be fitted for safety.



2 Here the user propels the large wheels on the side of the trolley to move around.

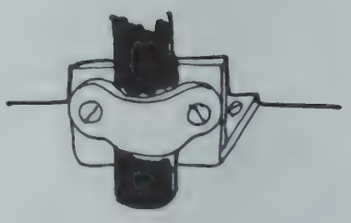


A small castor at the centre front and back allows direction to be changed easily.

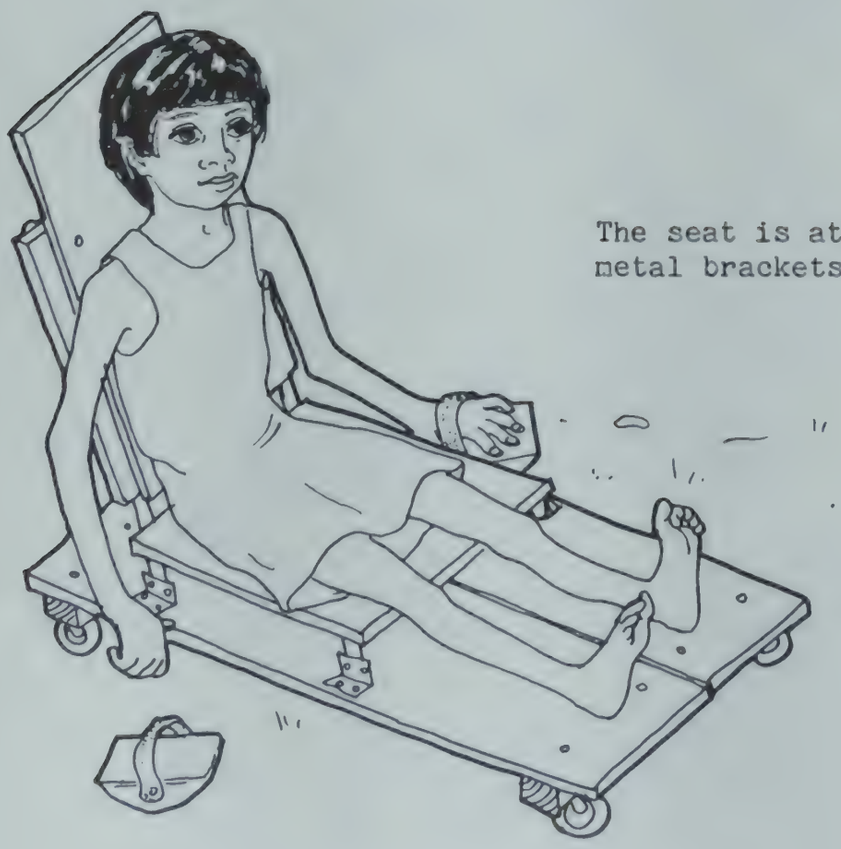


3 Extra back support is provided here.

A braking device may need to be fitted for safety.



The seat is attached to the platform by using metal brackets and hinges.

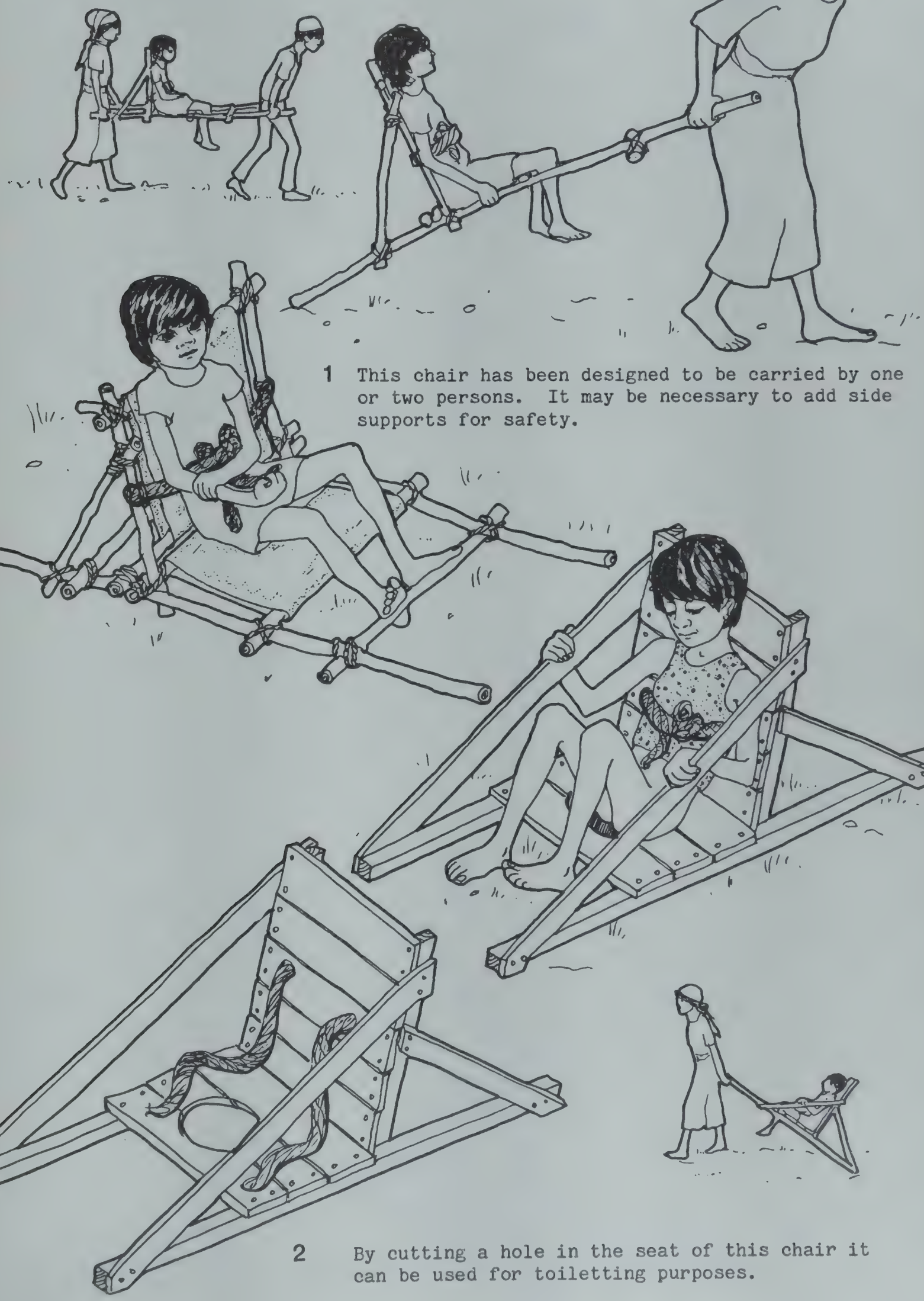


Protection for hands may be needed if the ground is rough.

Wooden blocks or rockers used on the hands may help in propelling the trolley.

CARRYING CHAIRS

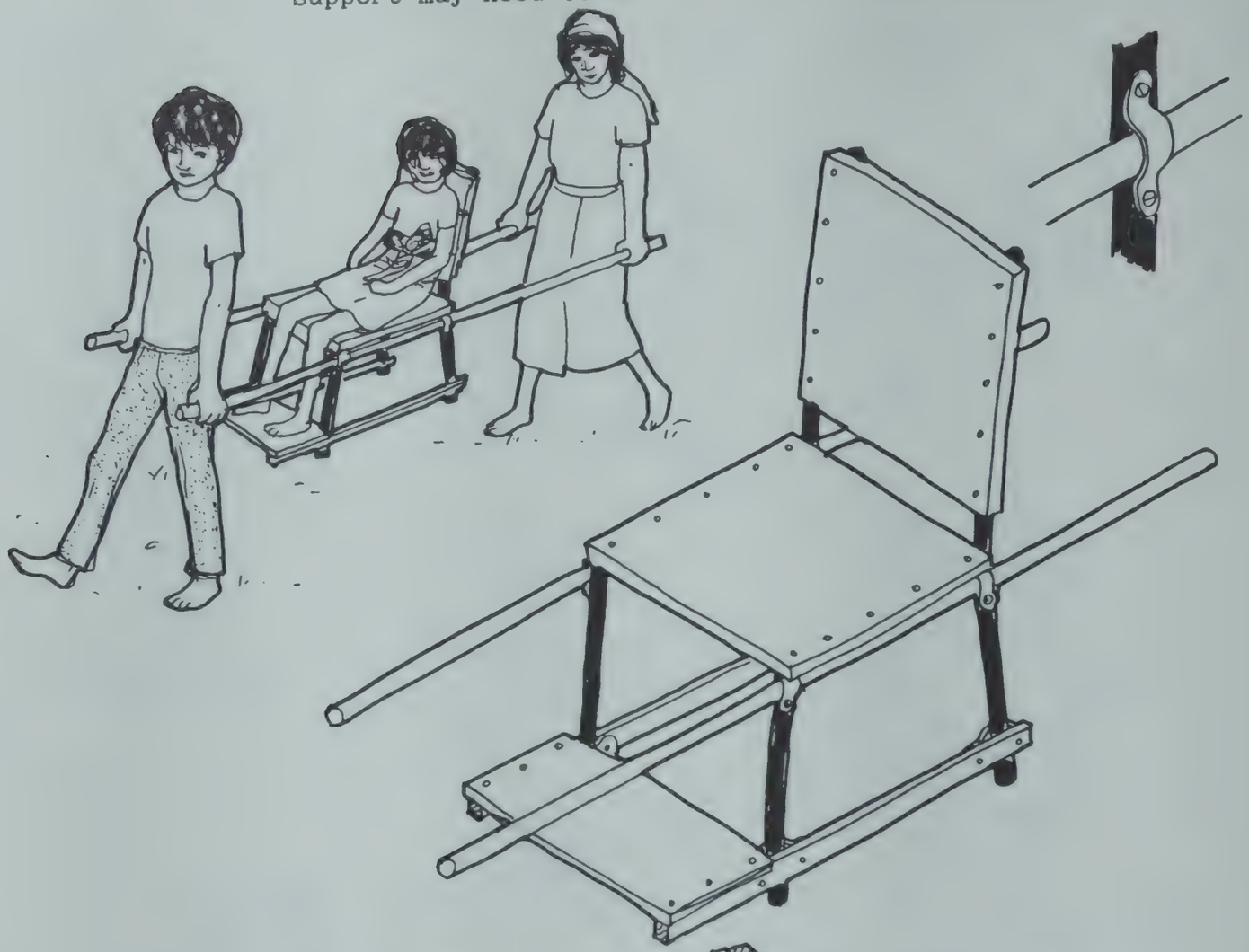
In some cases it may not be practical to use wheels on a chair in order to transport a person around - it may be easier to carry the chair.

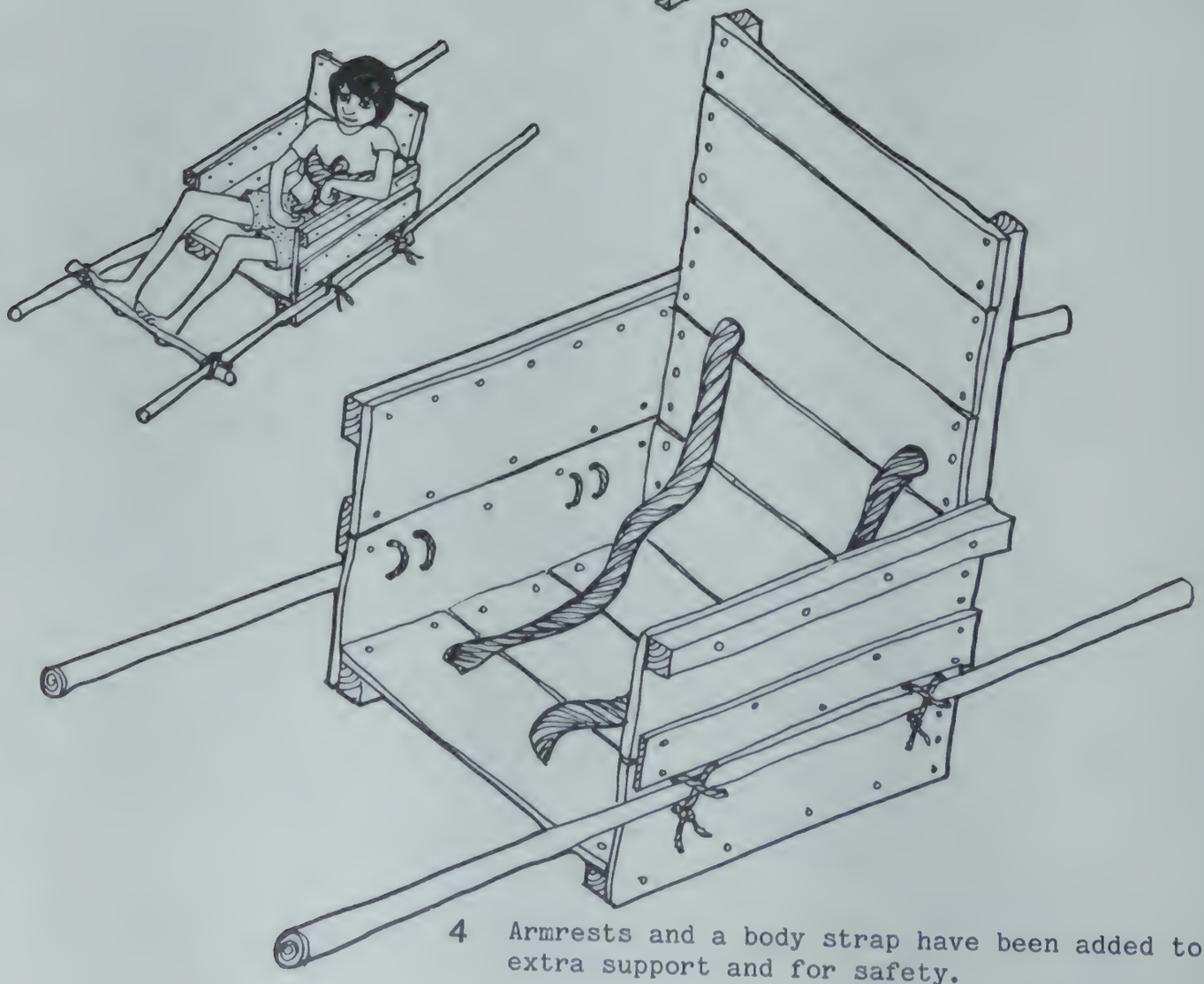


1 This chair has been designed to be carried by one or two persons. It may be necessary to add side supports for safety.

2 By cutting a hole in the seat of this chair it can be used for toiletting purposes.

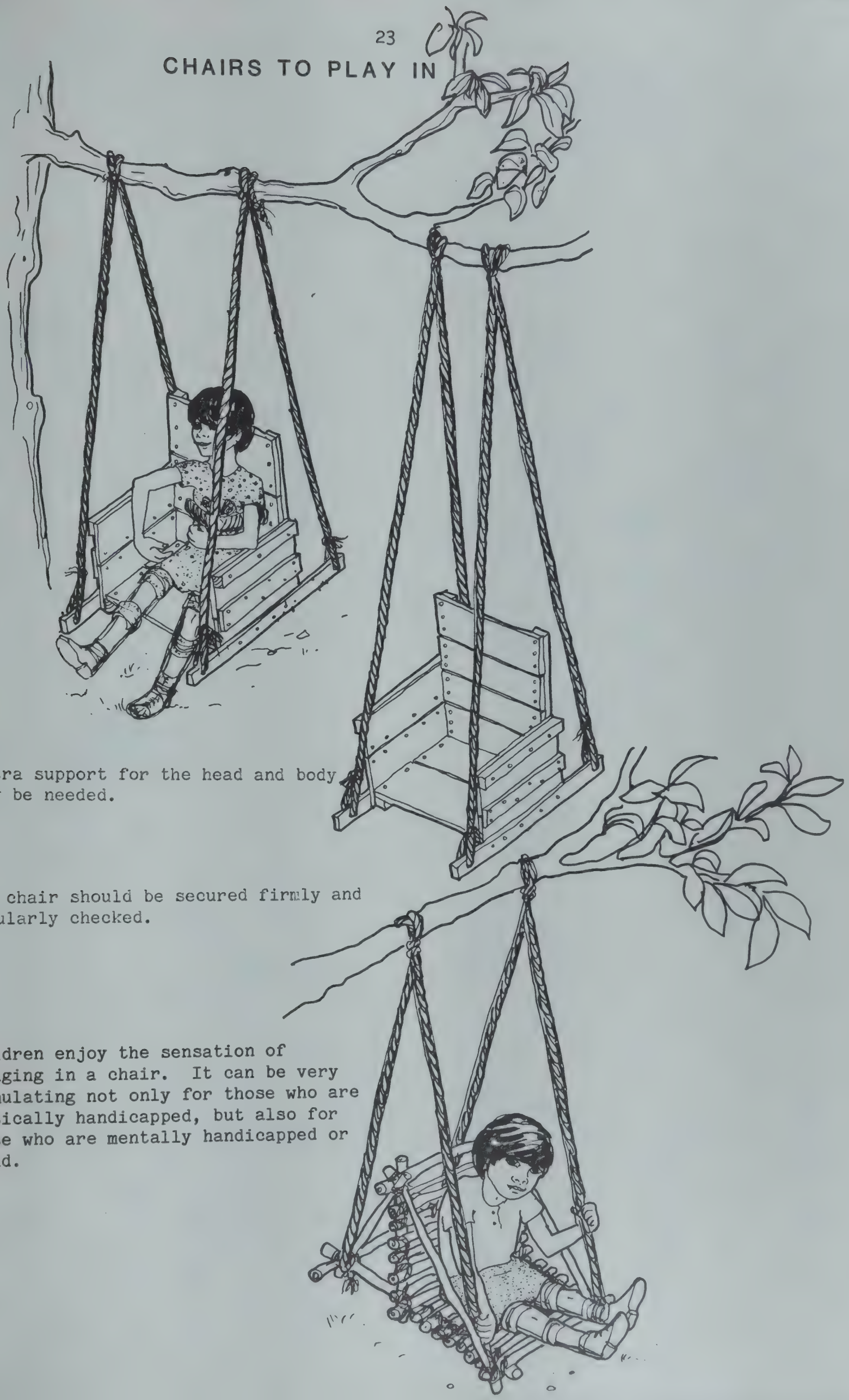
3 An ordinary chair has been converted to a carrying chair by attaching rods secured by metal brackets at each side. Extra body or head support may need to be added if the user is weak.





4 Armrests and a body strap have been added to give extra support and for safety.

CHAIRS TO PLAY IN



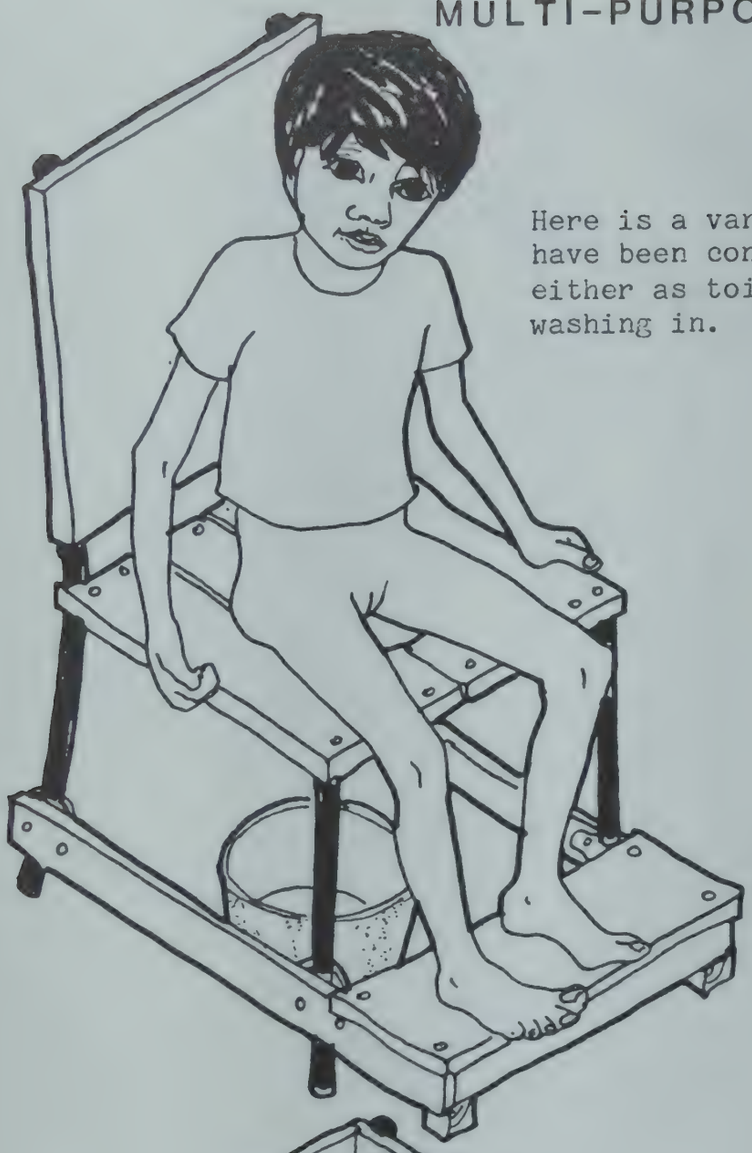
Extra support for the head and body may be needed.

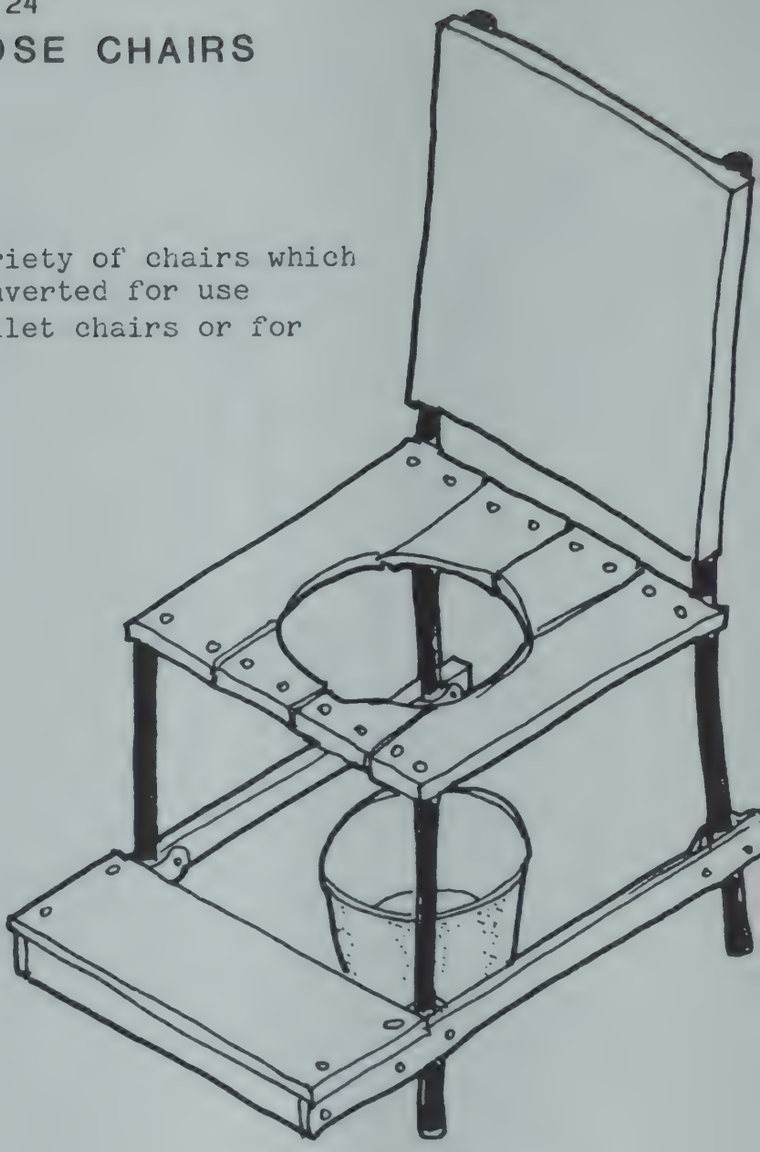
The chair should be secured firmly and regularly checked.

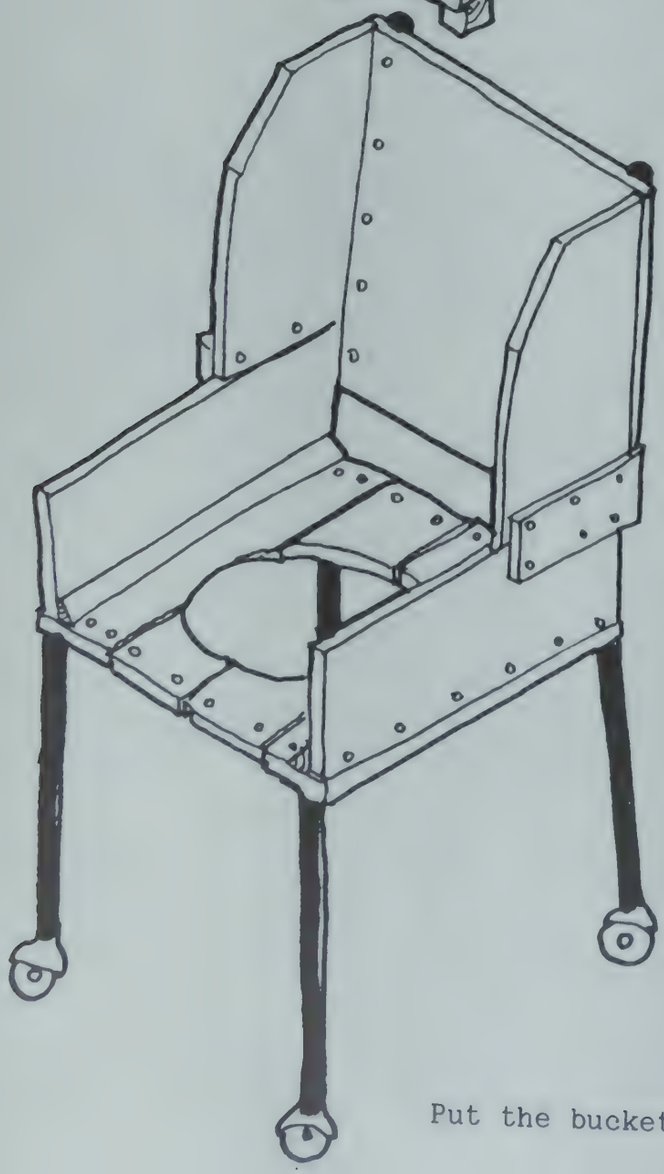
Children enjoy the sensation of swinging in a chair. It can be very stimulating not only for those who are physically handicapped, but also for those who are mentally handicapped or blind.

MULTI-PURPOSE CHAIRS

Here is a variety of chairs which have been converted for use either as toilet chairs or for washing in.

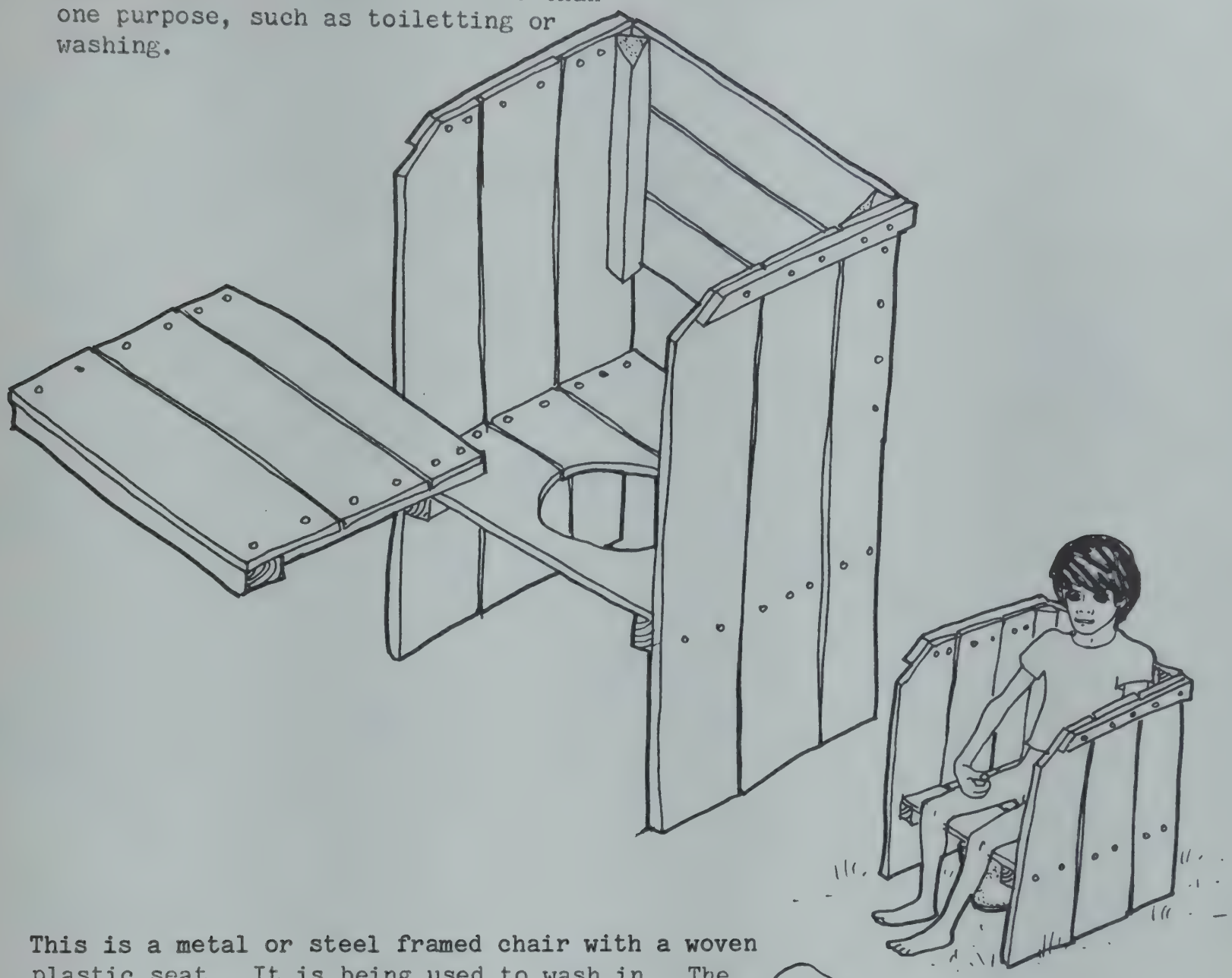




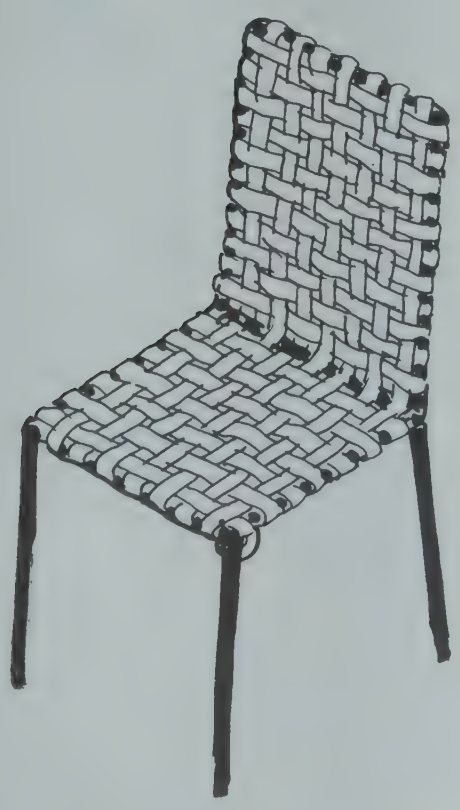


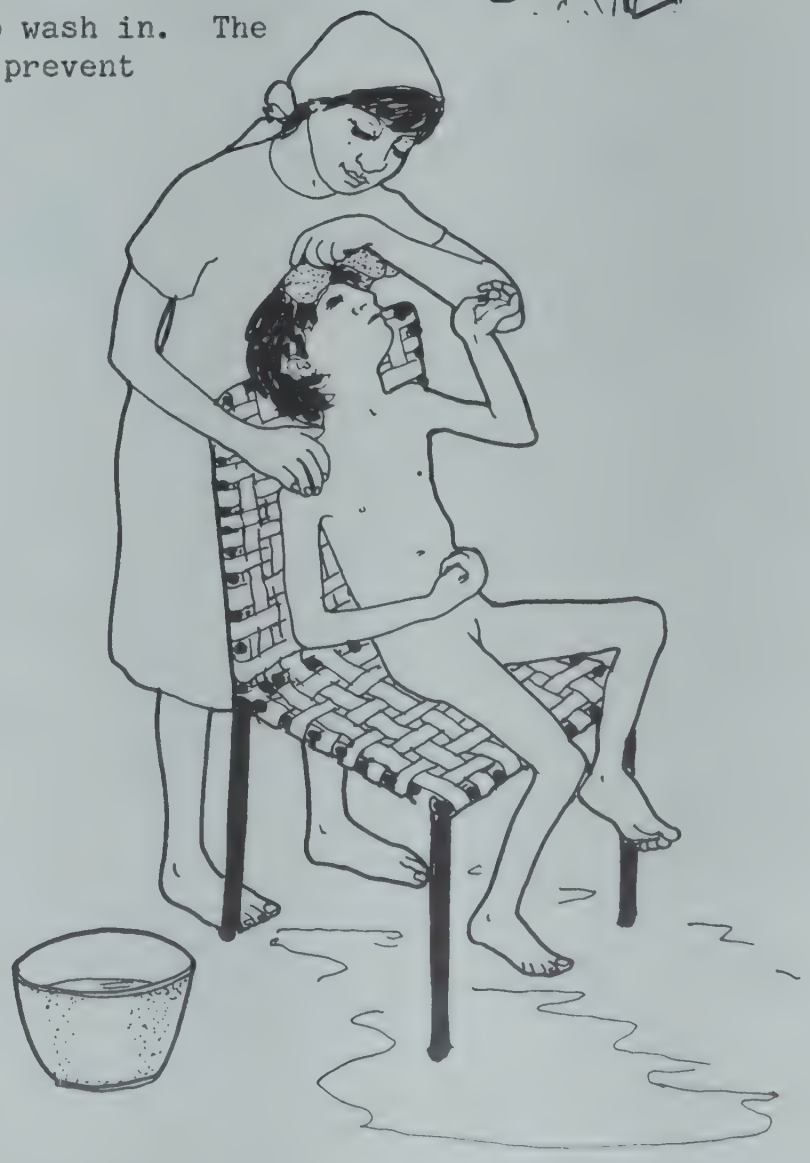
Put the bucket on top of a box to avoid spillage.

Often chairs are needed for more than one purpose, such as toiletting or washing.



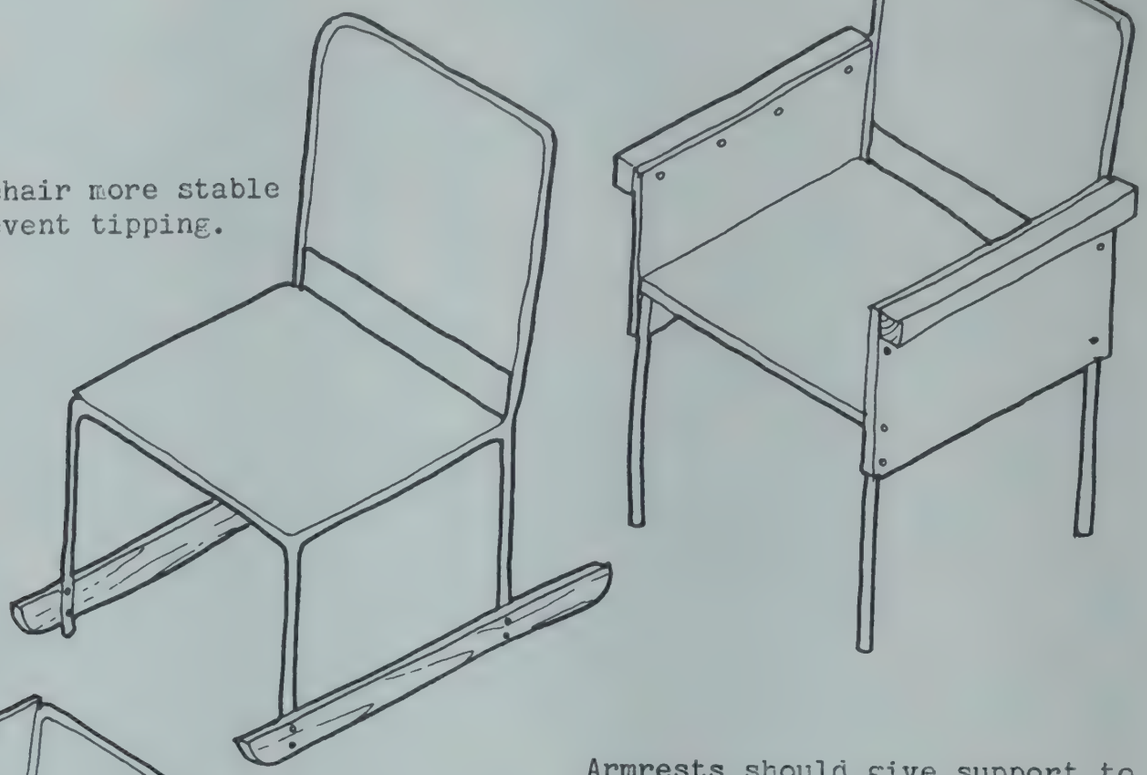
This is a metal or steel framed chair with a woven plastic seat. It is being used to wash in. The frame should be plastic coated to prevent rusting.





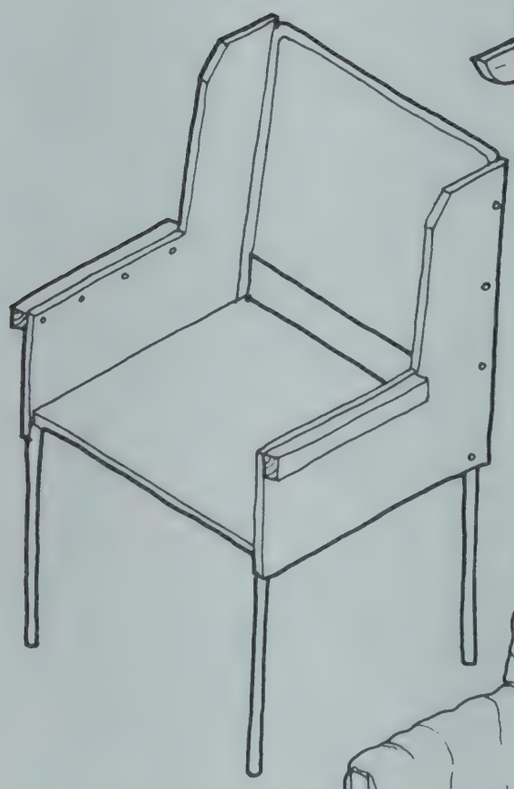
CHAIR CONVERSIONS

Sometimes ordinary chairs can be converted to suit disabled people.

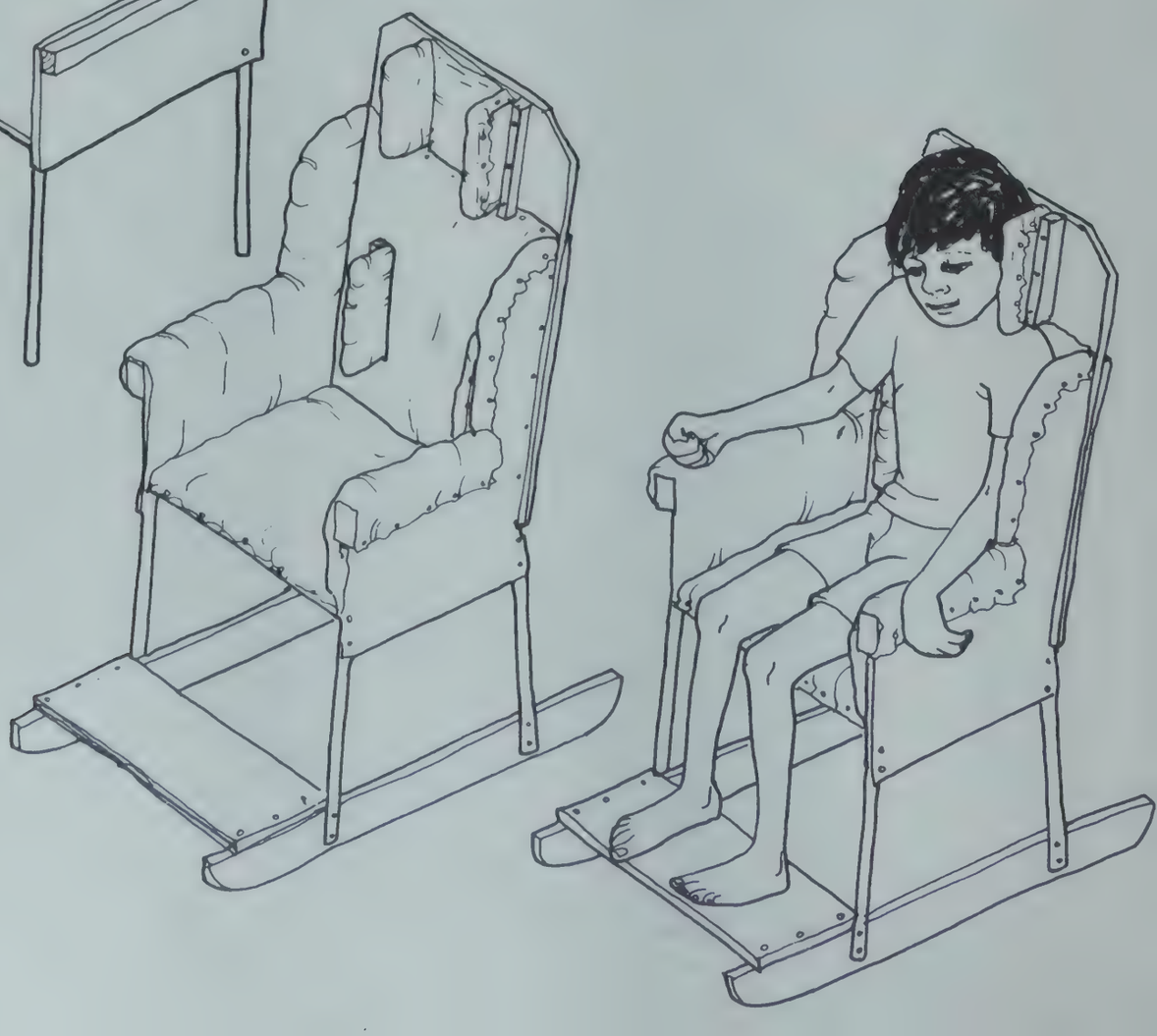


Skis make the chair more stable and help to prevent tipping.

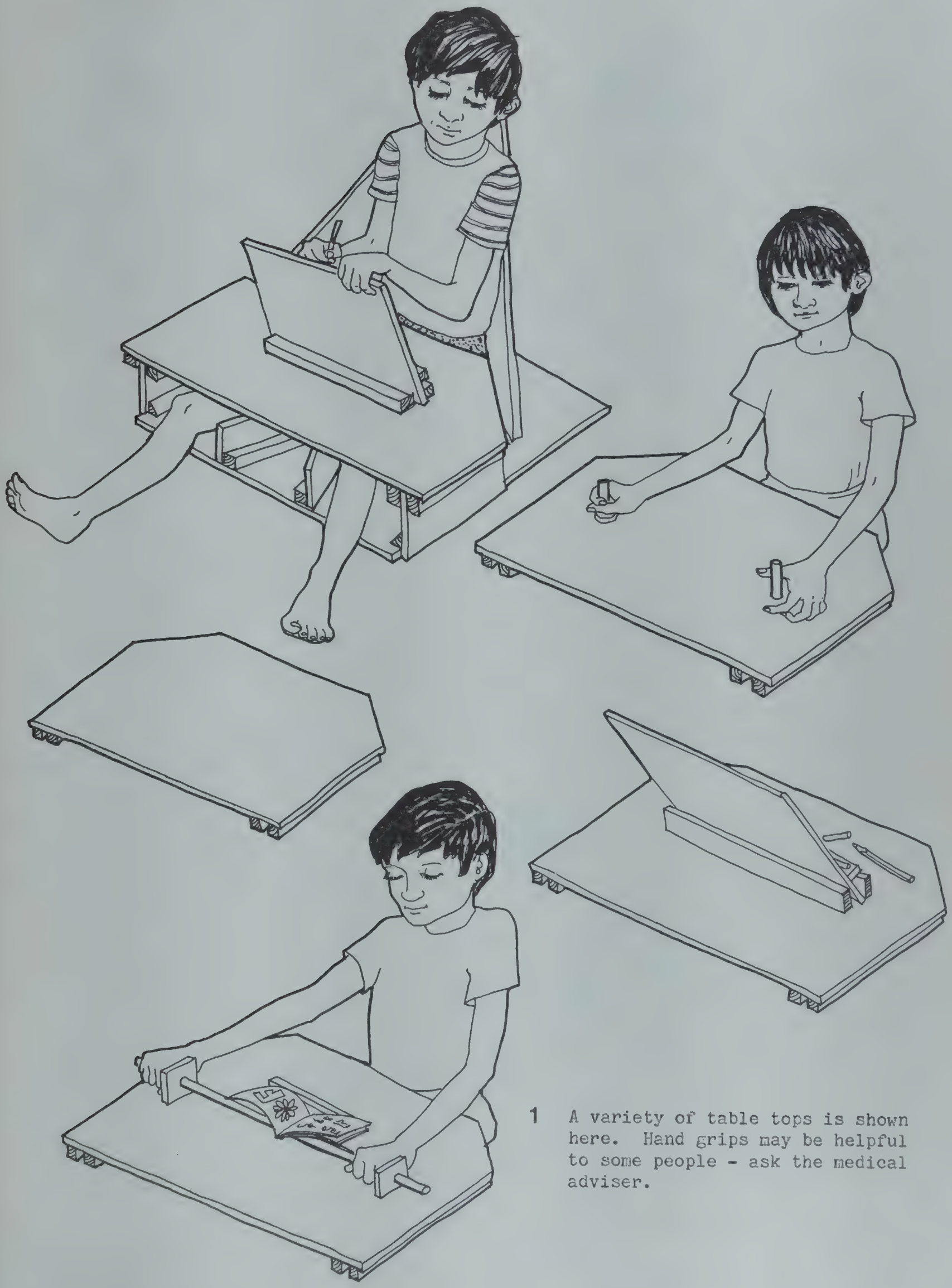
Armrests should give support to the arms. They should be high enough for comfort.



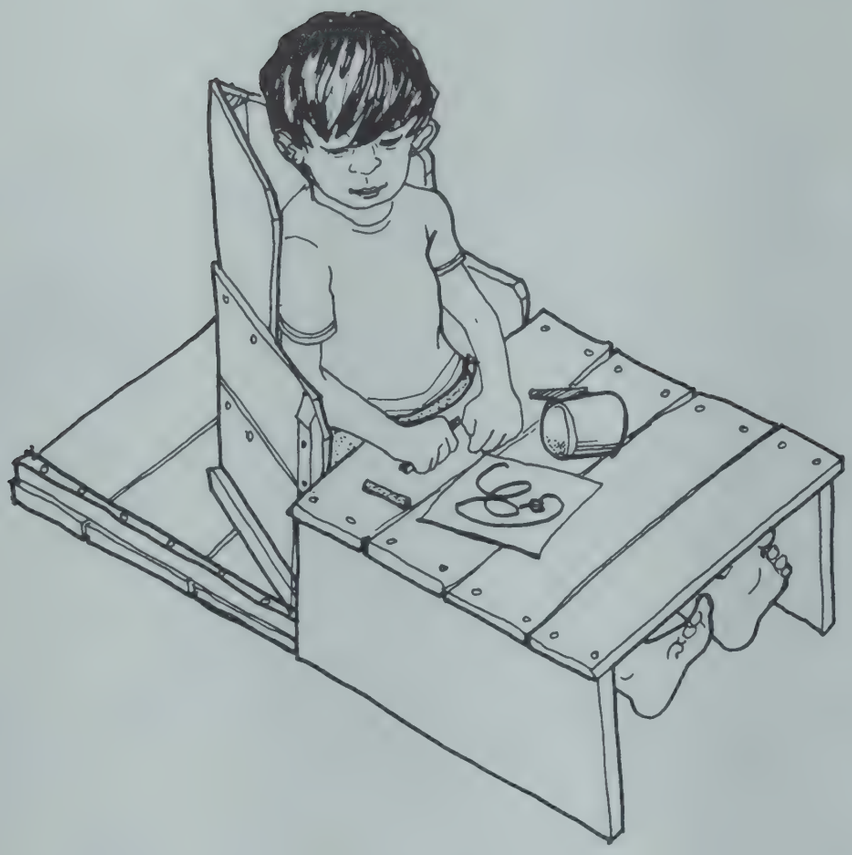
Sides give side support to shoulder level.

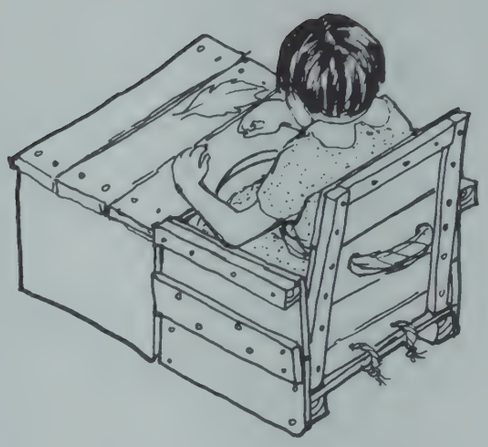


BACK RESTS AND TABLE TOPS

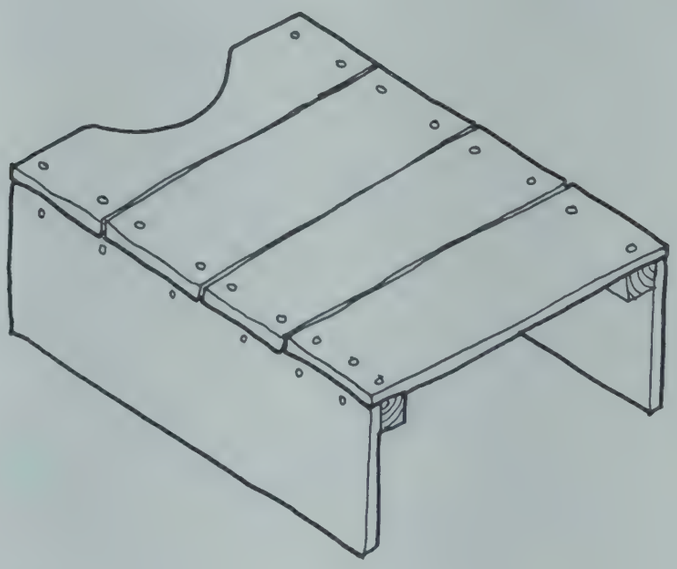


1 A variety of table tops is shown here. Hand grips may be helpful to some people - ask the medical adviser.

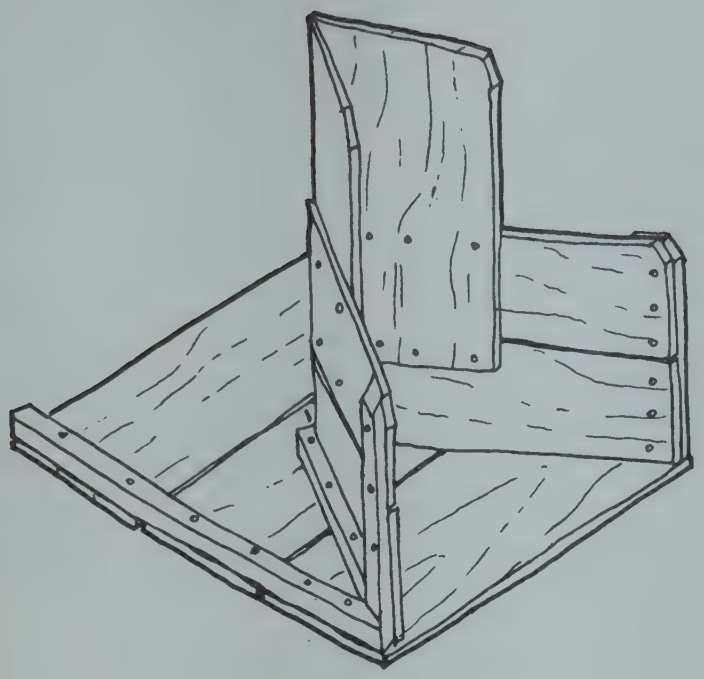




2 A table top or tray allows the person to play or work with the arms outstretched.

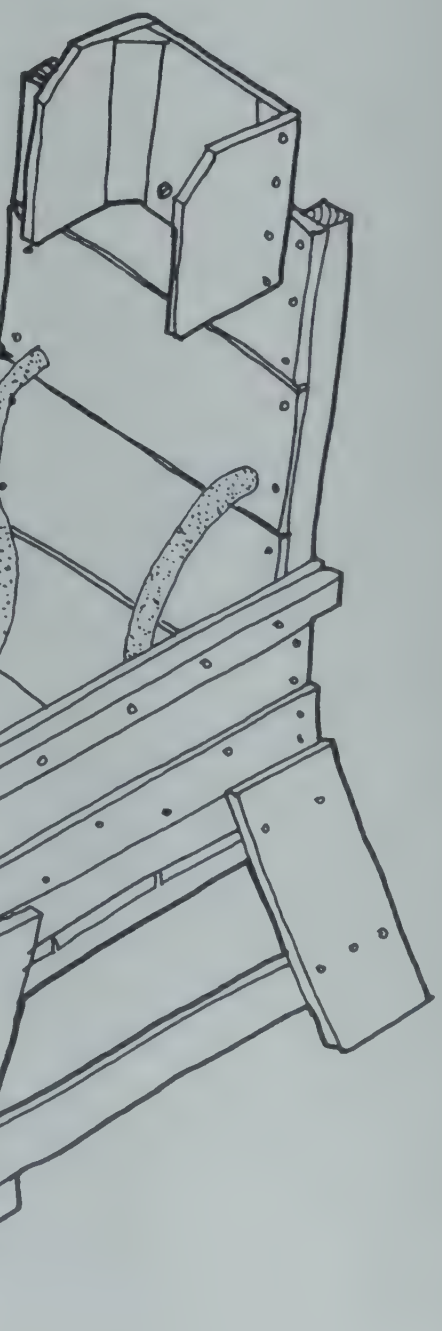


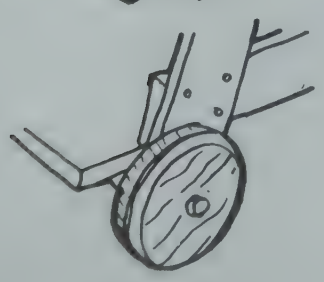
3 A table provides a work or play area with an abduction chair.

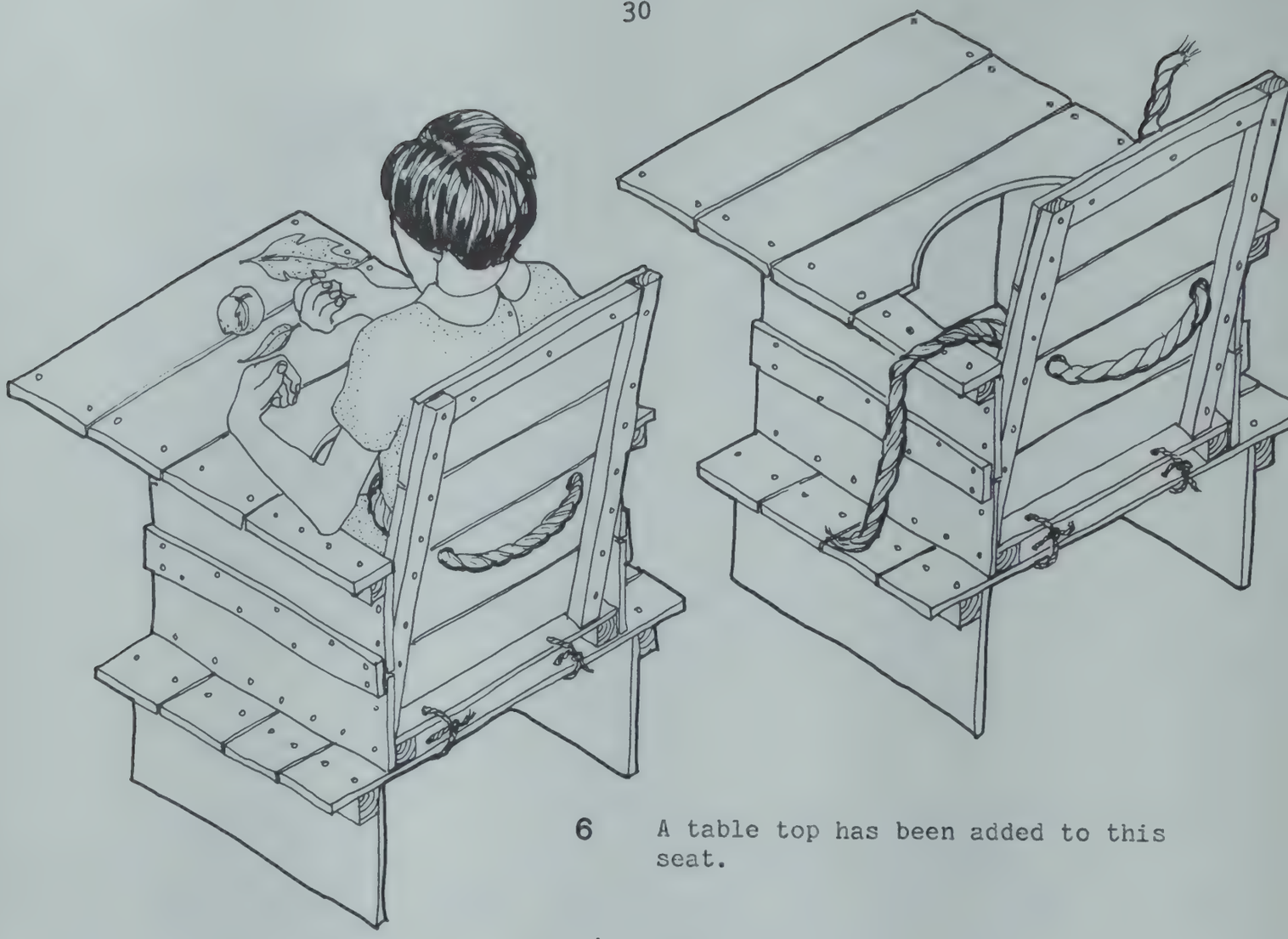


4 The back rest has been extended to provide head support in this corner seat.

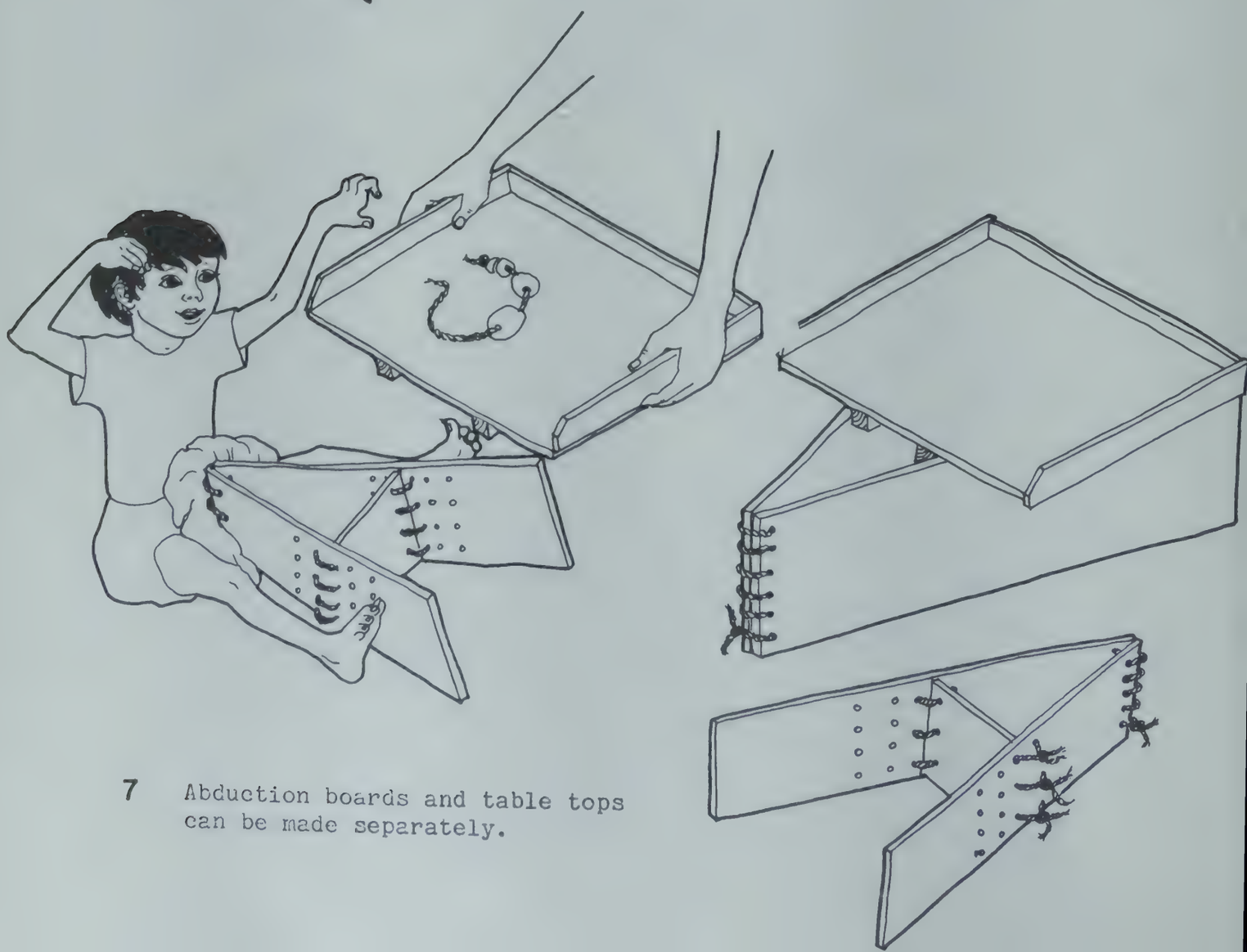
5 Extra head support is provided here. A body strap helps to prevent the person from slipping out of the chair. A tray has also been provided. By adding wheels the chair can be moved around, but then it would be necessary to add brakes.



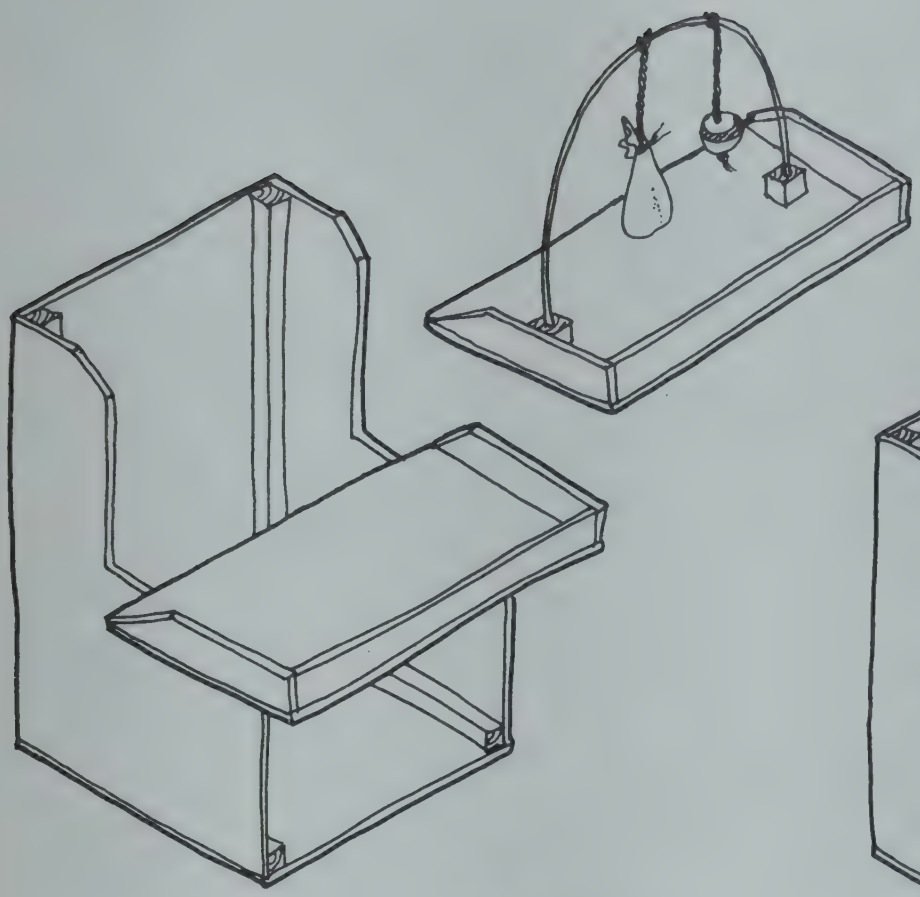




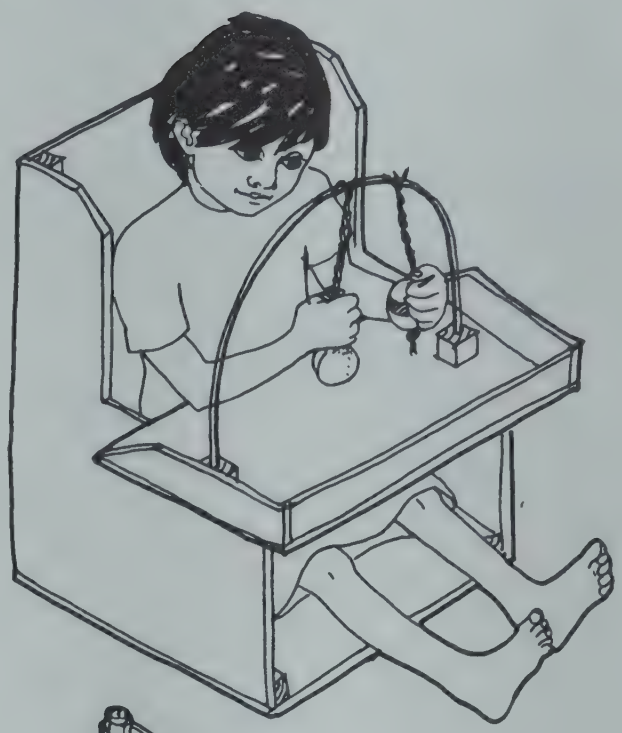
6 A table top has been added to this seat.

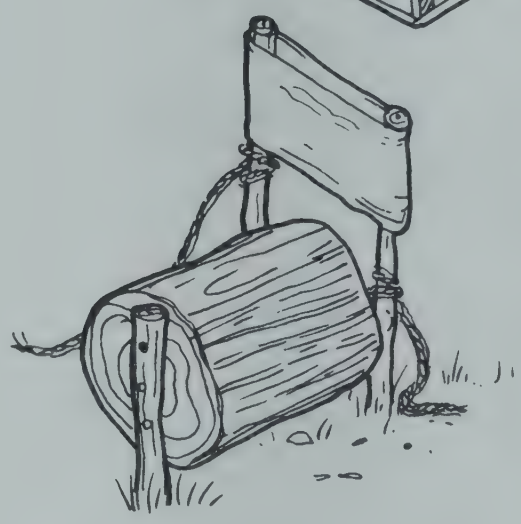


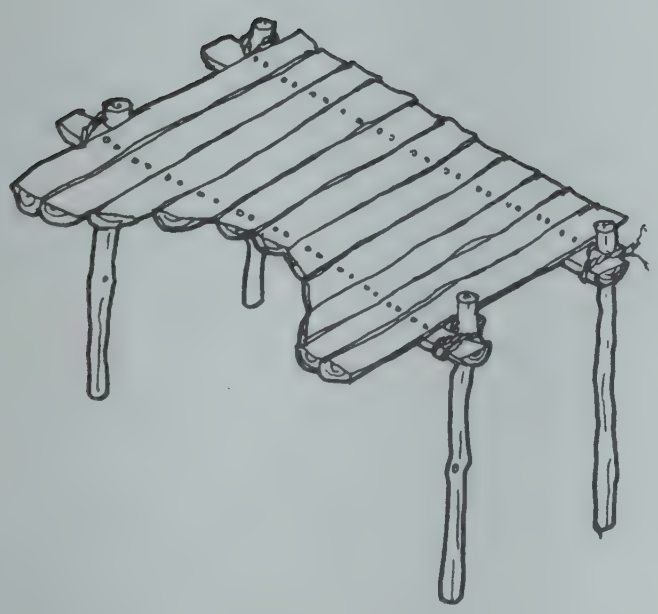
7 Abduction boards and table tops can be made separately.



8 By adding a table top to the seat the person has a surface on which to play, work or eat.



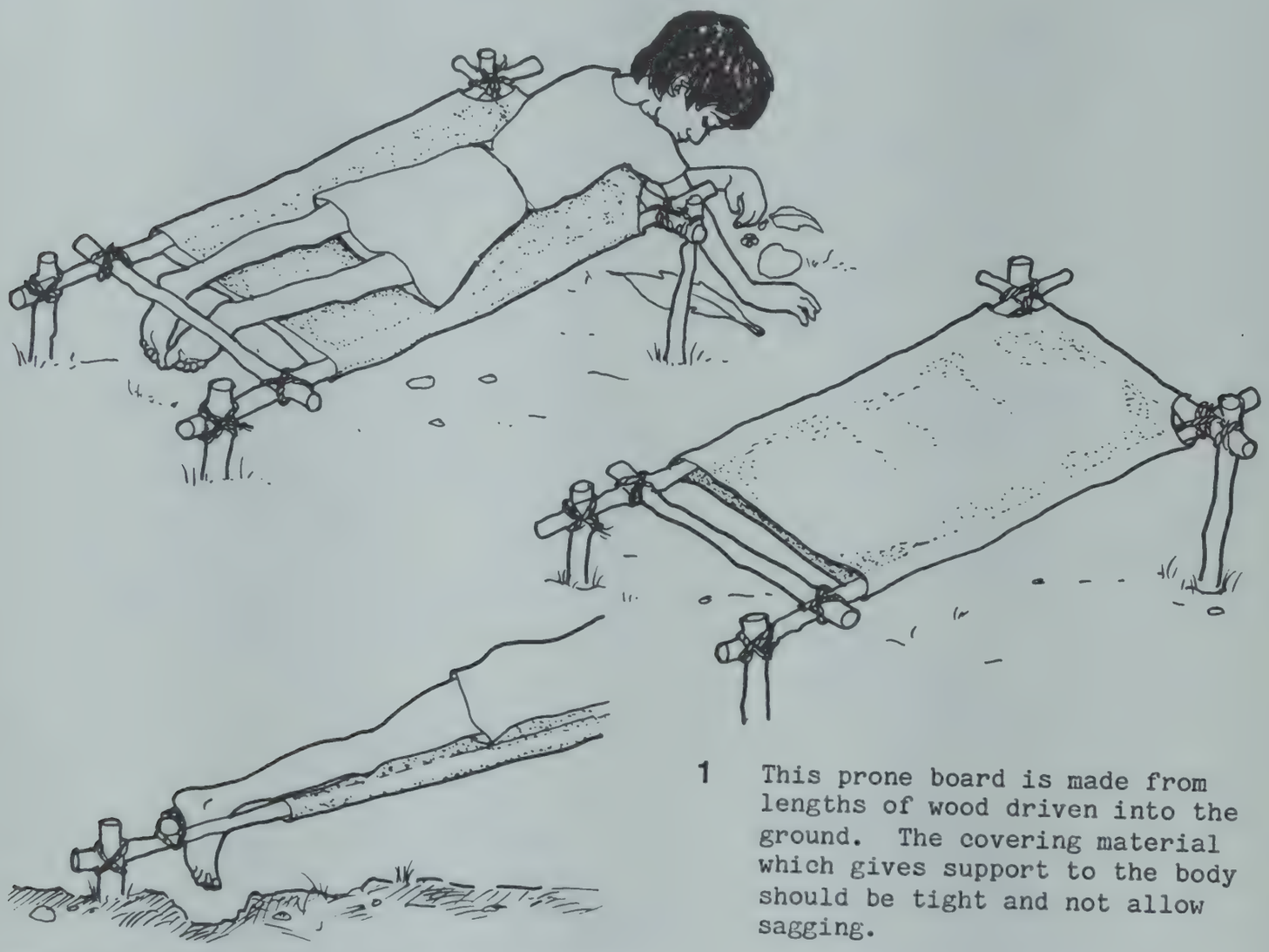




9 Here is a different sort of table. The cut out shape fits around the user and gives more support.

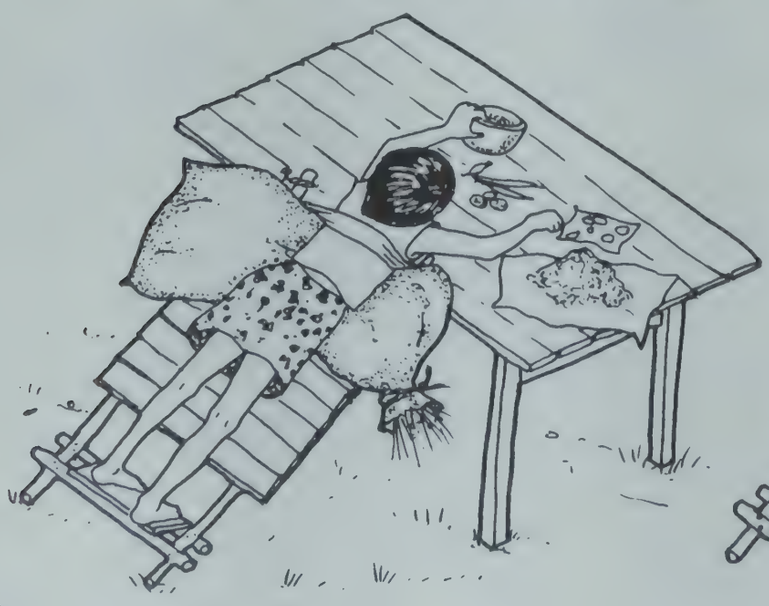
PRONE BOARDS

Prone boards allow children with head control to lie on their stomach, reach forward and use their hands. The hips and knees are kept straight.

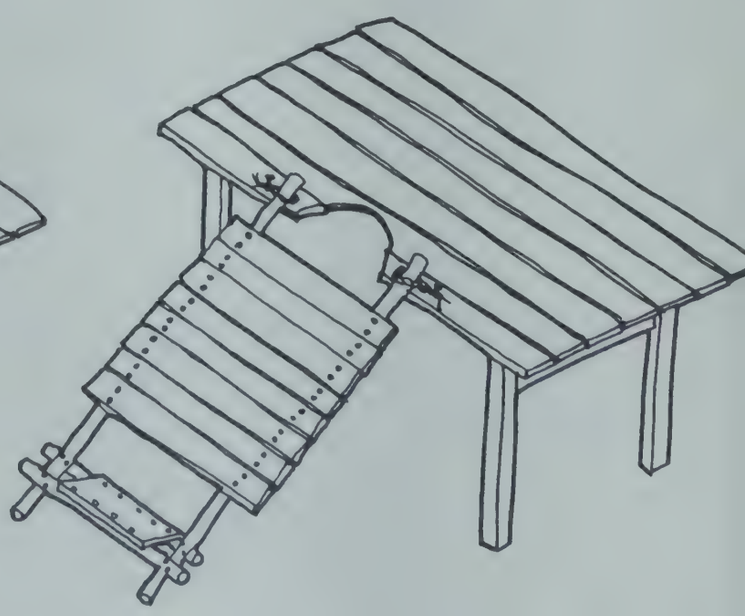


1 This prone board is made from lengths of wood driven into the ground. The covering material which gives support to the body should be tight and not allow sagging.

Note scoop in ground to allow room for feet



2 Here the prone board is made entirely from wood and secured to the table. Padding may be needed to prevent the child from hurting her/himself on the wood. Be careful not to let the padding restrict the movement of the arms.



3 This picture shows the table more clearly. Note the cut-out at the front which allows the child to get closer to the table and gives some support.

PART TWO

Walking Aids

aids to walking

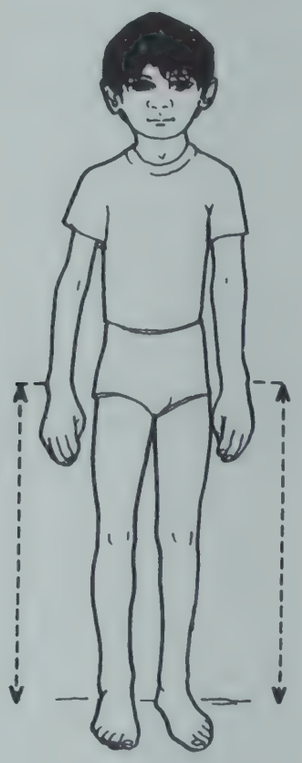
Many types of walking aids can be made and your medical adviser will help you to select the correct one.

It is important that the aid is the correct height for the user otherwise it will not help. Instructions are given to show you how to measure for the aid.

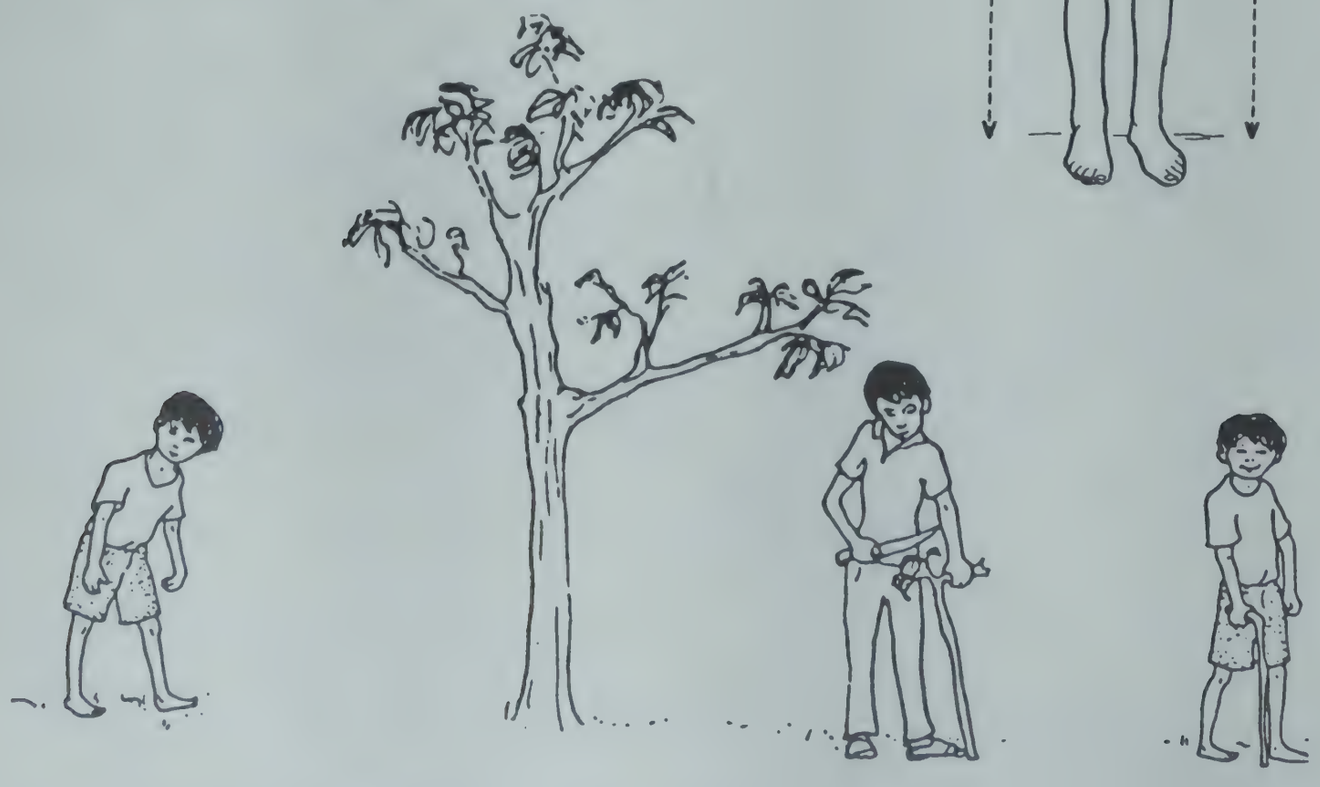
You will need to consider the environment in which the aid is being used. When people's homes are small the aid may be too big to use indoors. It may be difficult to climb steps using the aid - perhaps a shallow ramp can be made instead or a hand rail constructed. Uneven ground surfaces may be a problem and cause the user to fall over.

Try to make your environment as free as possible from hazards to allow a disabled person to have freedom of movement.

WALKING STICKS



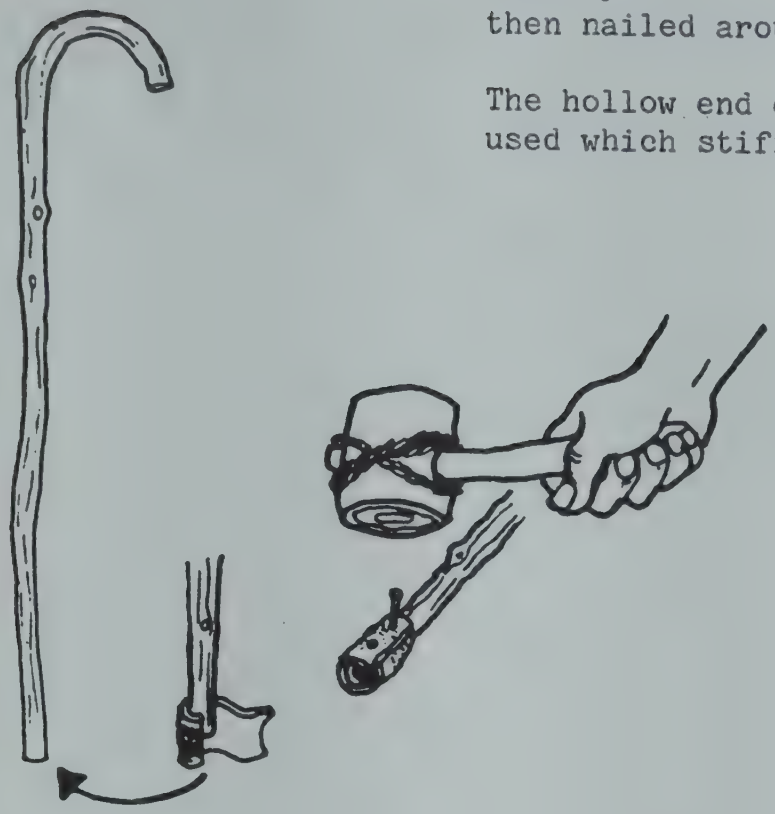
How to measure The user must stand up straight, facing forward with the arms relaxed by the side and the palm of the hands facing back. The body weight must be evenly distributed on both feet. Measure from the wrist bone above the little finger to the floor. This will give the correct height for the stick.

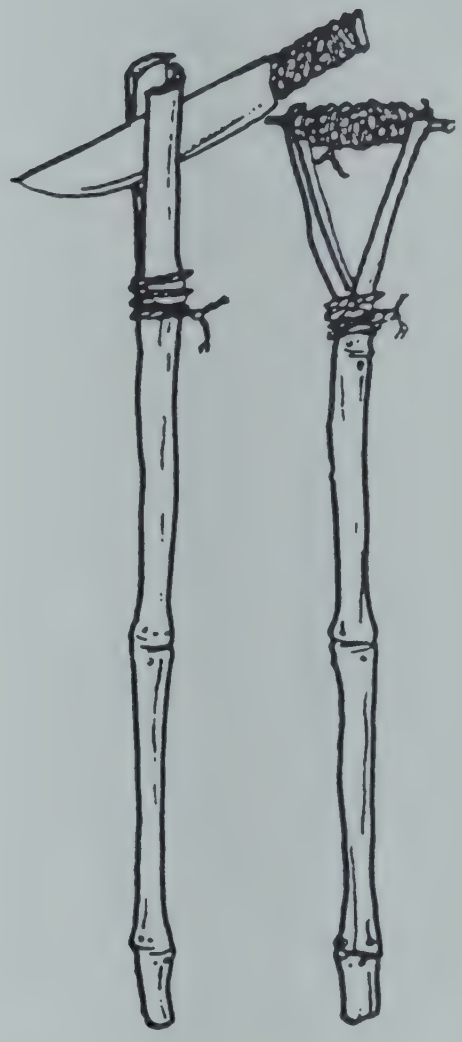


1 A branch of a tree can be used to make a stick.

The tip can be made from a bicycle tyre which is then nailed around the tip.

The hollow end of the tip fills with soil when used which stiffens the rubber and prolongs use.

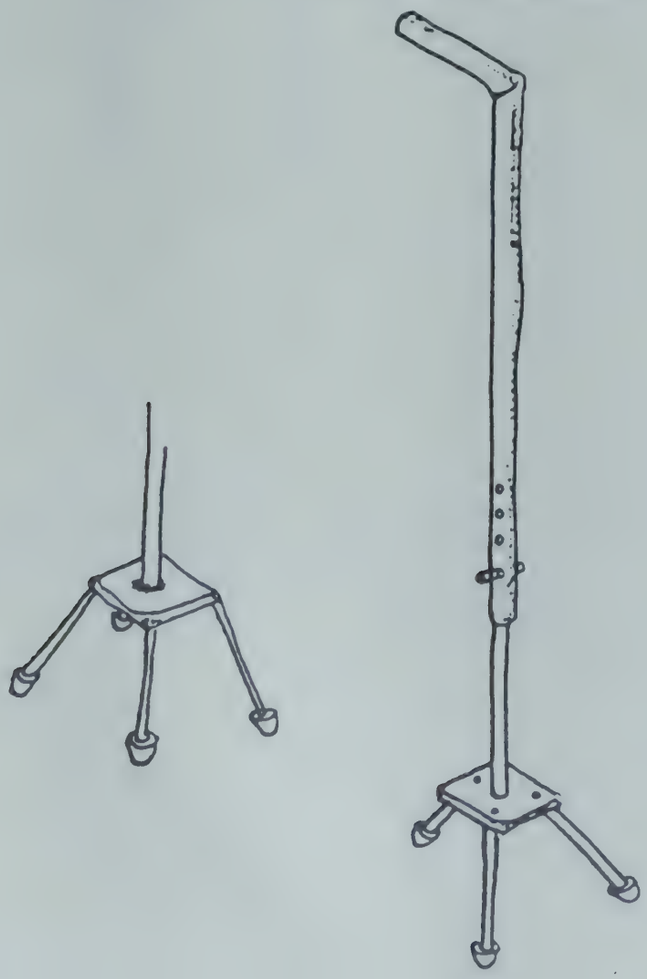




Different types of handles can be made.

2 This stick has 4 feet and is much more stable than an ordinary walking stick, so is useful if a person needs more support.

3 Metal sticks are useful - their height can be adjusted to suit individual needs. To obtain the correct height, measure in the same way as the wooden walking stick.



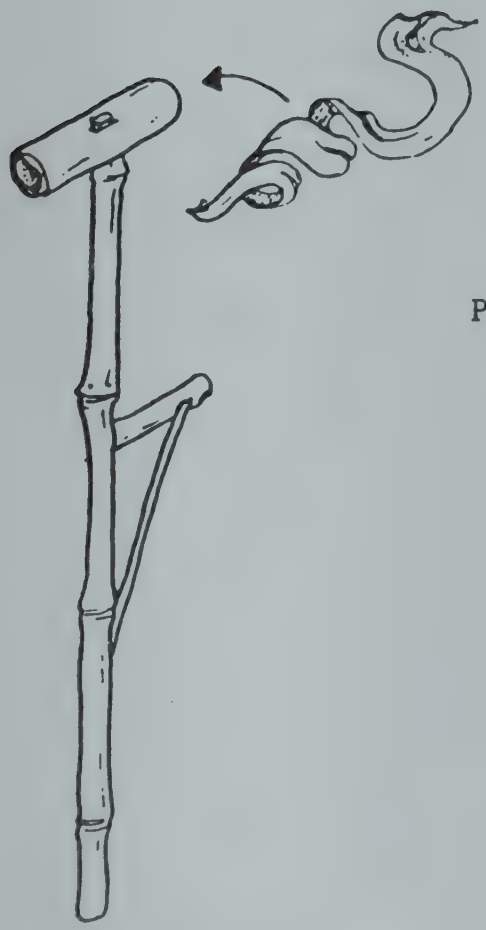
CRUTCHES

Crutches should be used in pairs.

It is important that the user takes their weight through the wrist and hand and not under their arm, as nerve damage will result.

How to measure The height of the hand grip is measured in the same way as the walking stick. There should be a gap of 3 fingers width between the top of the crutch pad and the under arm.

Padding made from cloth

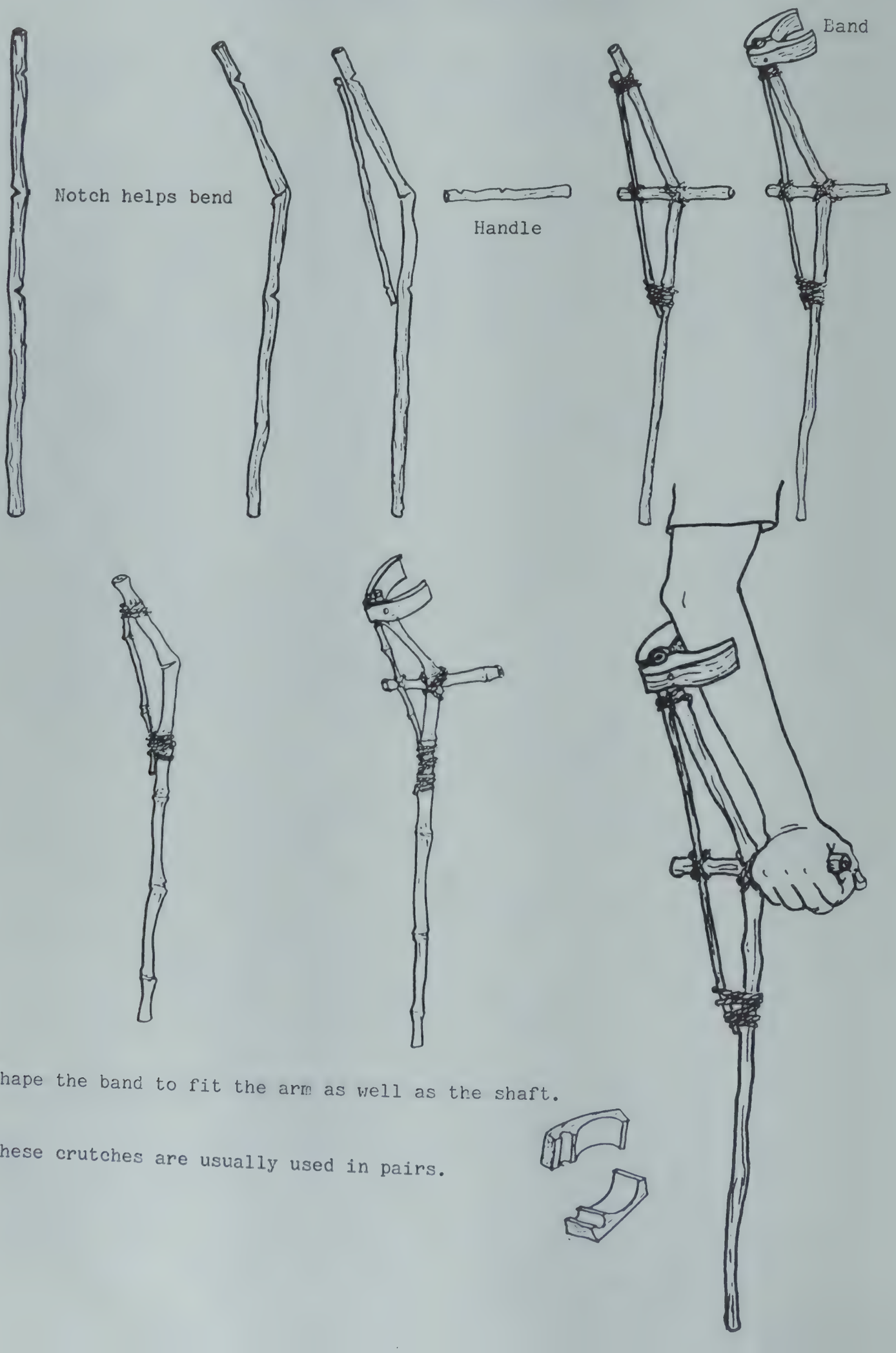


Padding

METAL CRUTCHES

TREE OR BAMBOO ELBOW CRUTCHES

How to measure The height of the hand grip is measured in the same way as the walking stick.



Shape the band to fit the arm as well as the shaft.

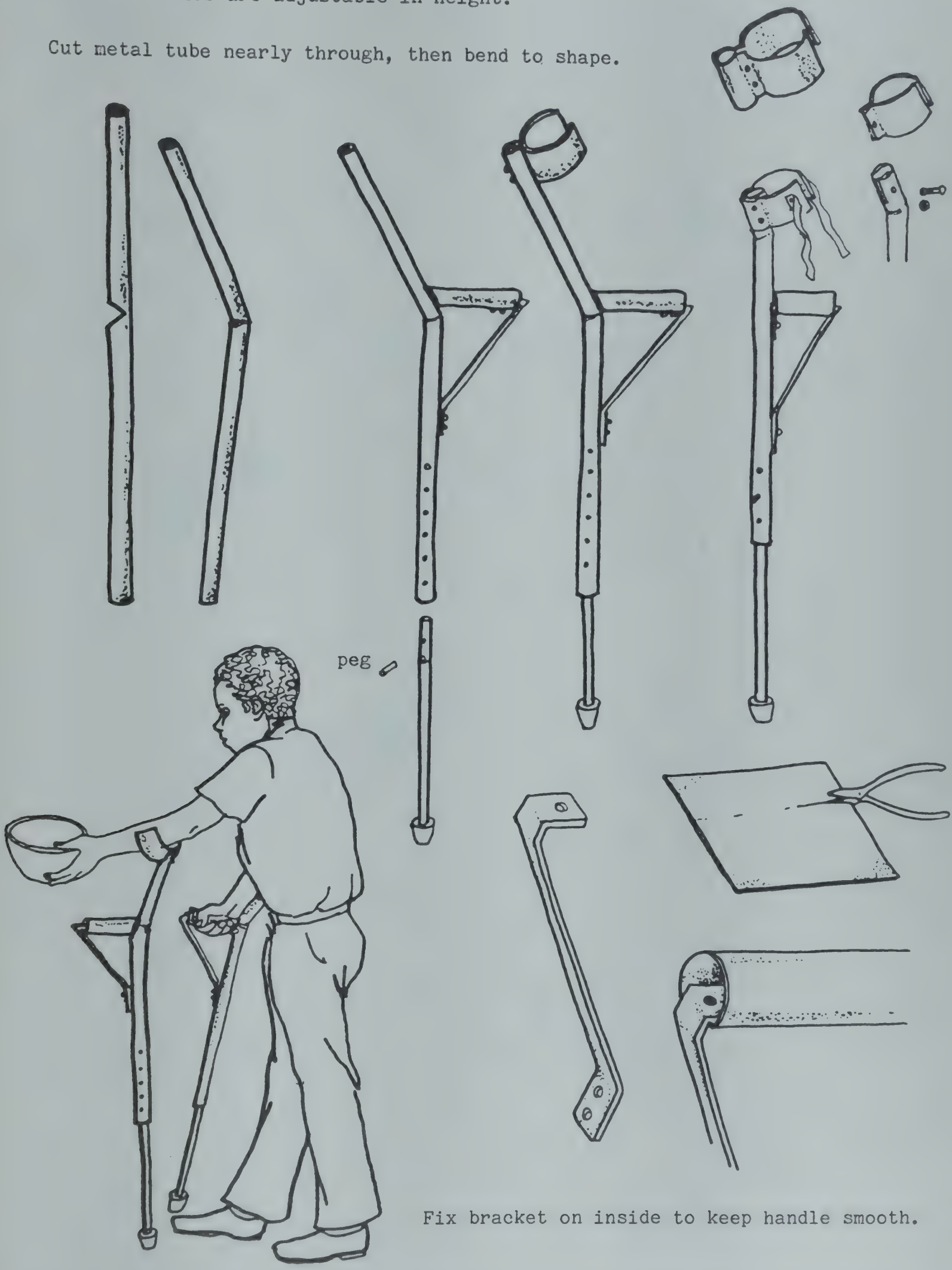
These crutches are usually used in pairs.

METAL ELBOW CRUTCHES

Users of elbow crutches must have strong arms as they support most of the body weight when walking on these aids.

These crutches are adjustable in height.

Cut metal tube nearly through, then bend to shape.



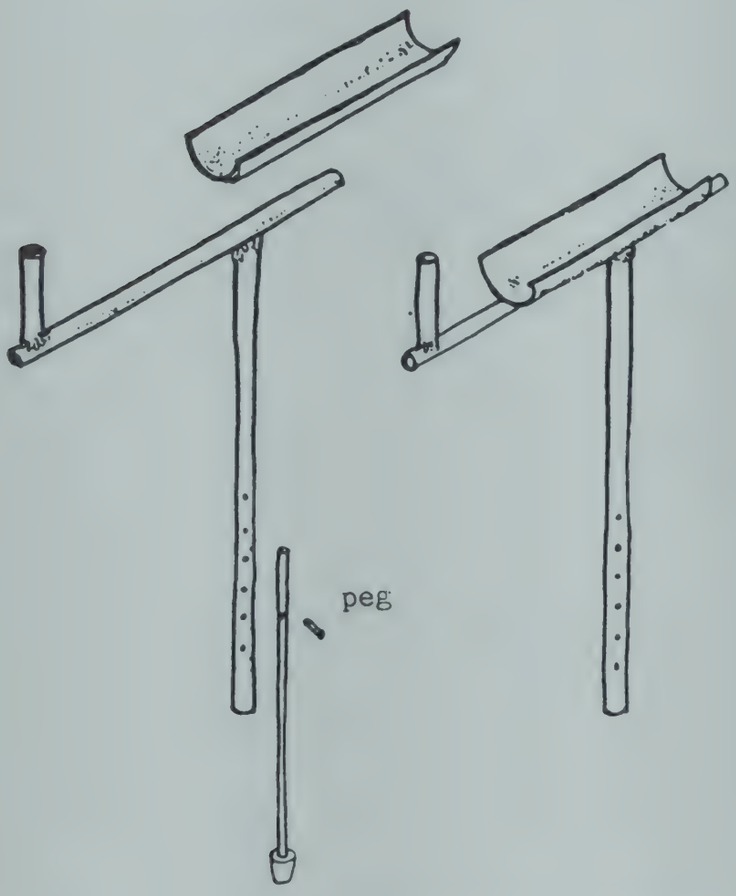
Fix bracket on inside to keep handle smooth.

Metal sheet can be shaped to fit the arm and the shaft.

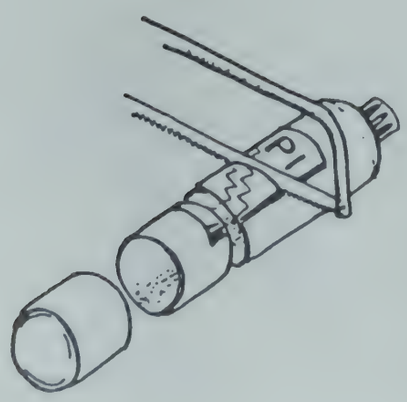
GUTTER CRUTCHES

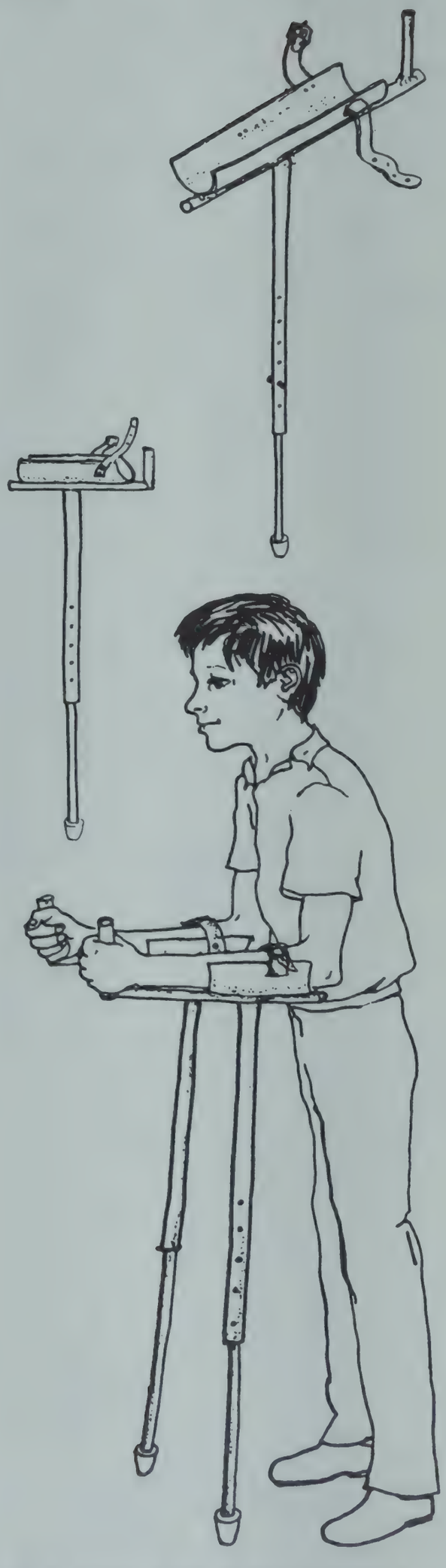
METAL GUTTER CRUTCHES

How to measure The user should stand as upright as possible with the weight evenly distributed on both feet. Measure from the floor to the elbow. The gutter should be fixed at this height.



Usually used in pairs.

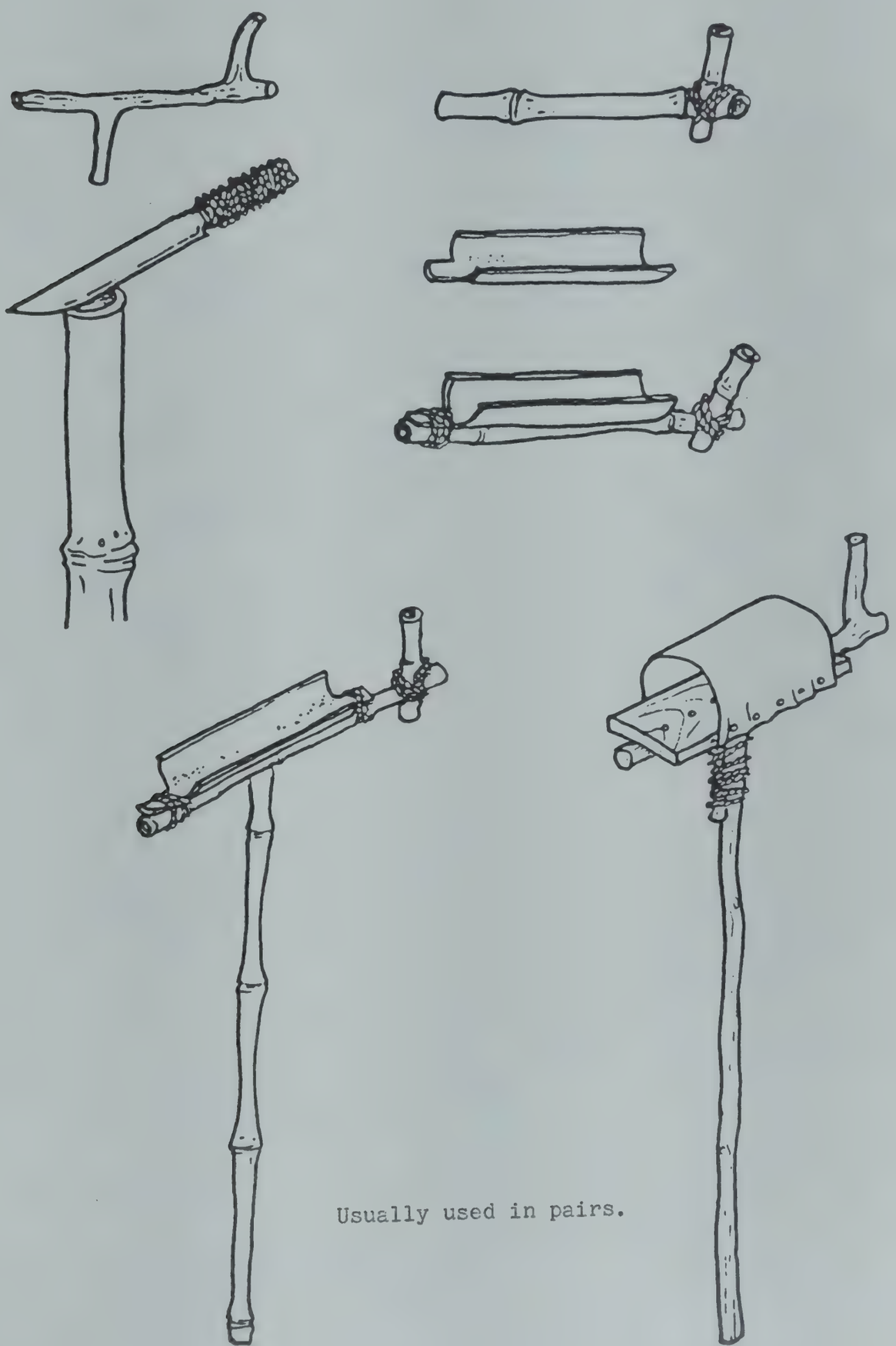




The arm holder for a crutch can be cut from a heavy duty plastic bottle, or made from metal sheet.

BAMBOO OR TREE GUTTER CRUTCHES

How to measure The user should stand as upright as possible with the weight evenly distributed on both feet. Measure from the floor to the elbow. The gutter should be fixed at this height.



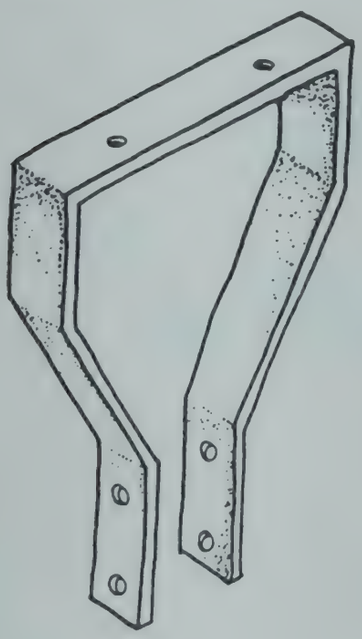
Usually used in pairs.

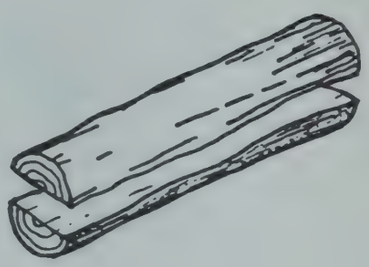
HANDLES

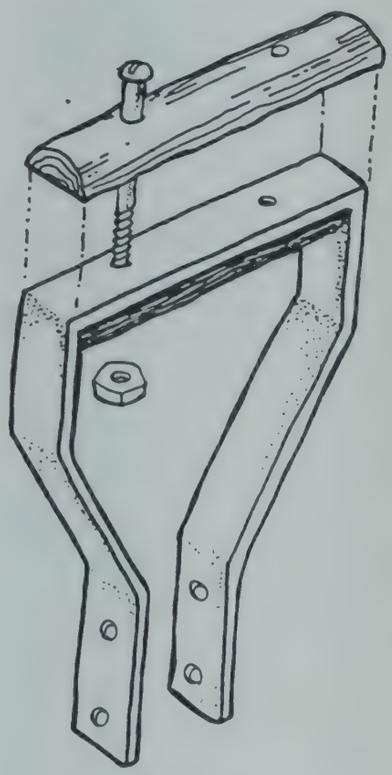
Handles can be made from wood or metal or a combination of both.

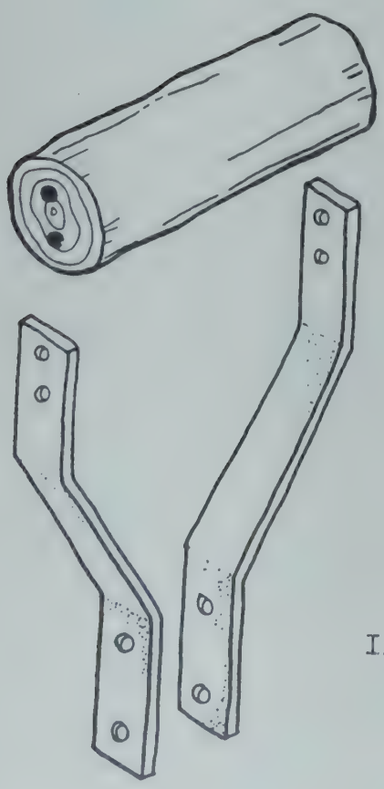
It is important that they are not loose otherwise they can be difficult to hold securely and will not give support.

HANDLE MADE FROM WOOD AND METAL



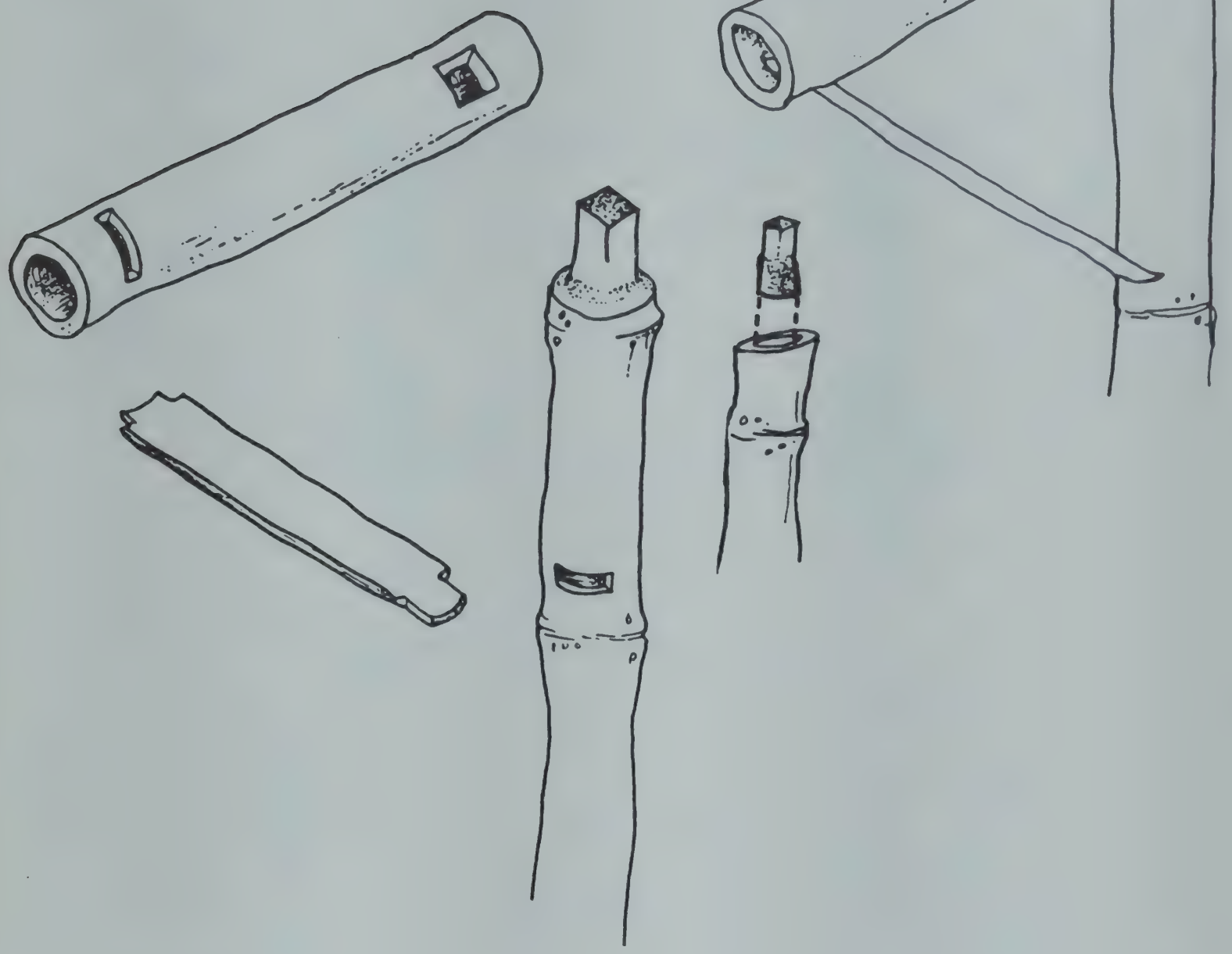




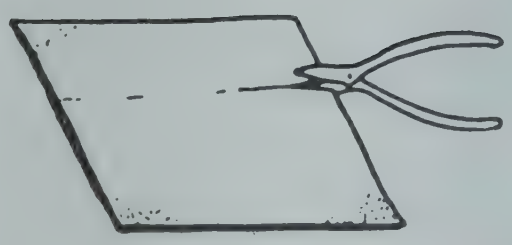


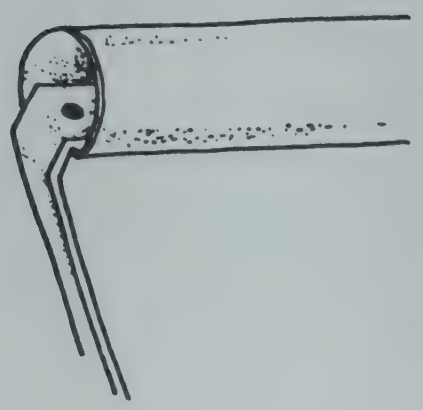
If wood is used make sure there are no splinters.

BAMBOO HANDLE



HANDLE CUT FROM SHEET METAL



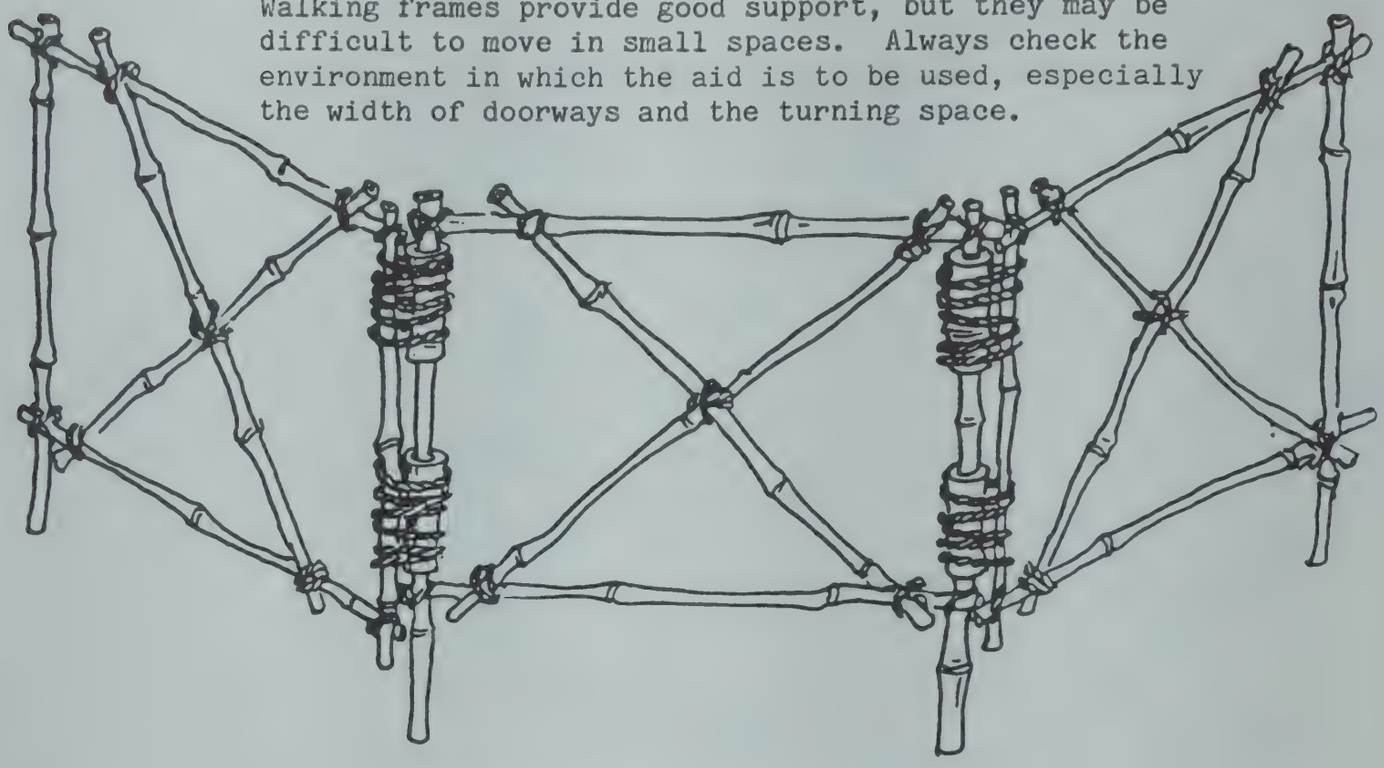


Fix bracket on inside to keep handle smooth.

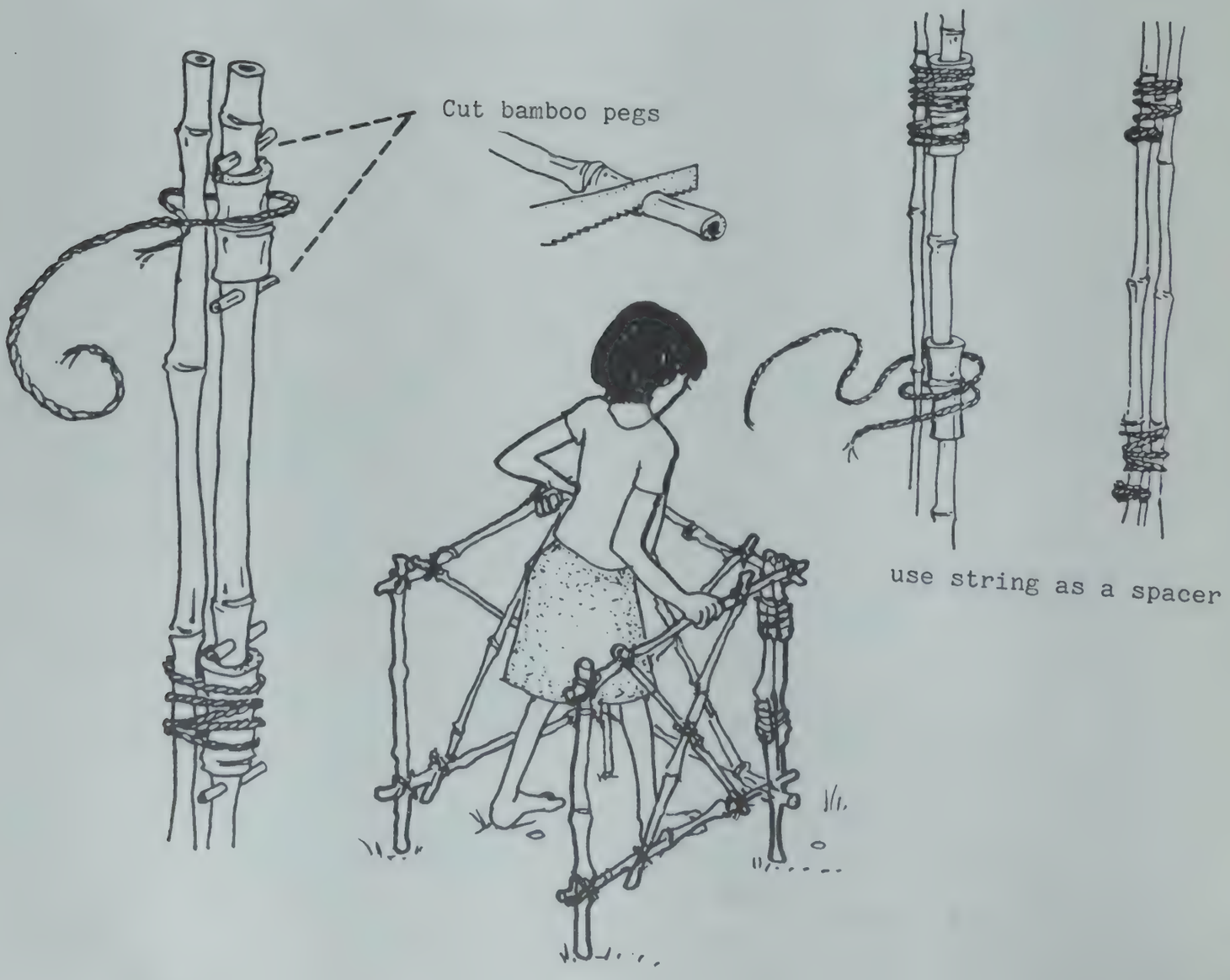
WALKING FRAMES

How to measure The height is measured in the same way as the walking stick.

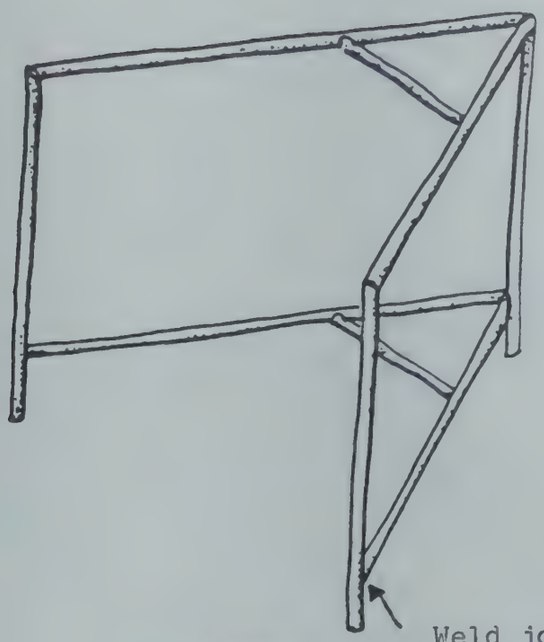
Walking frames provide good support, but they may be difficult to move in small spaces. Always check the environment in which the aid is to be used, especially the width of doorways and the turning space.



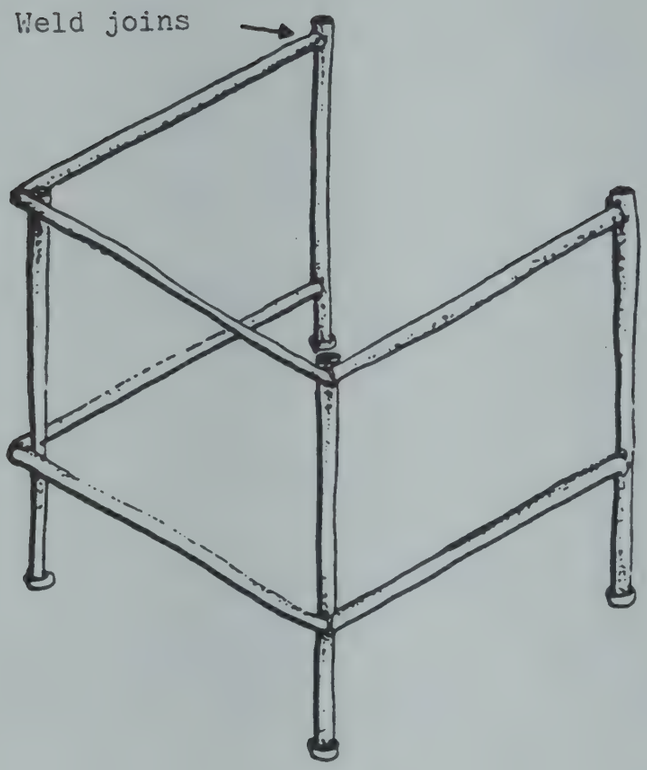
1 Hinged walking frame made from bamboo



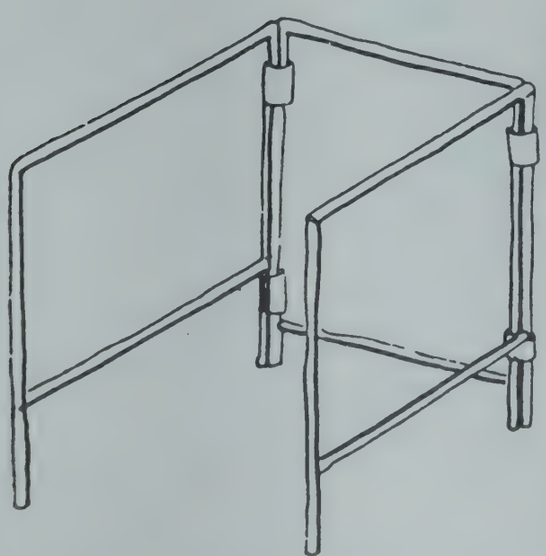
2 Walking frames made from metal tube



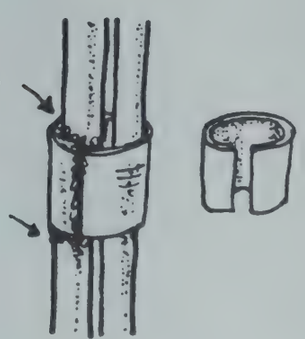
Weld joins



3 Hinged walking frame made from metal tube

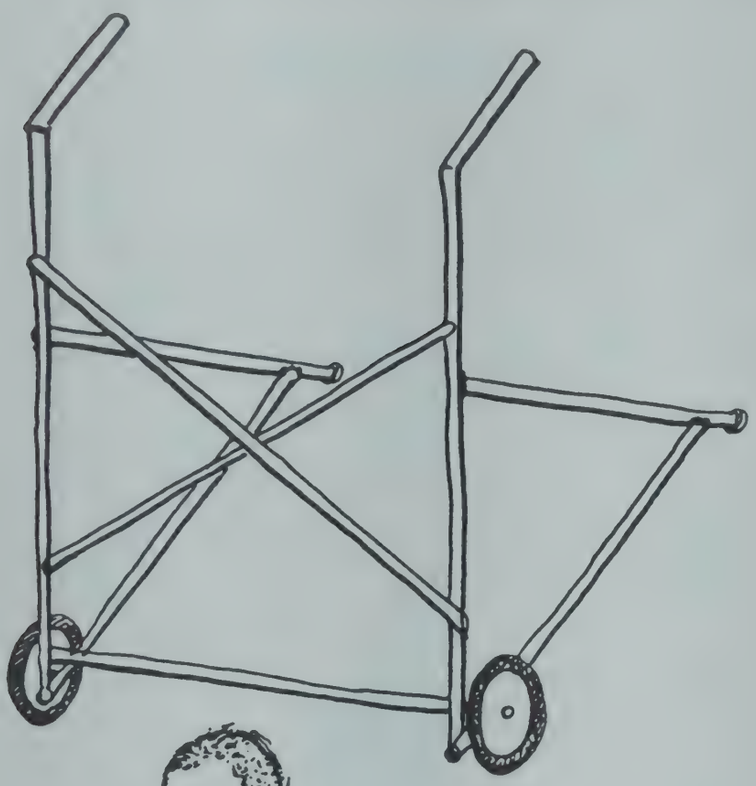


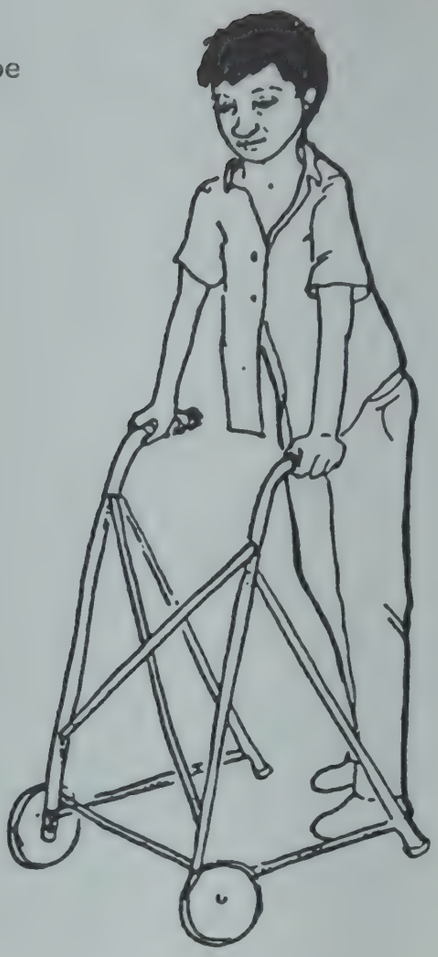
Weld one tube onto hinge.

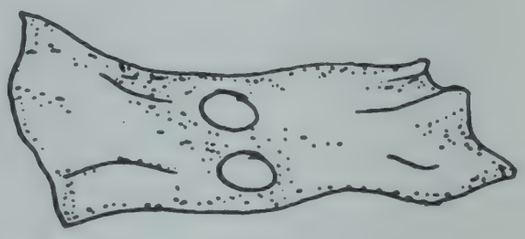


Hinge made from metal sheet.

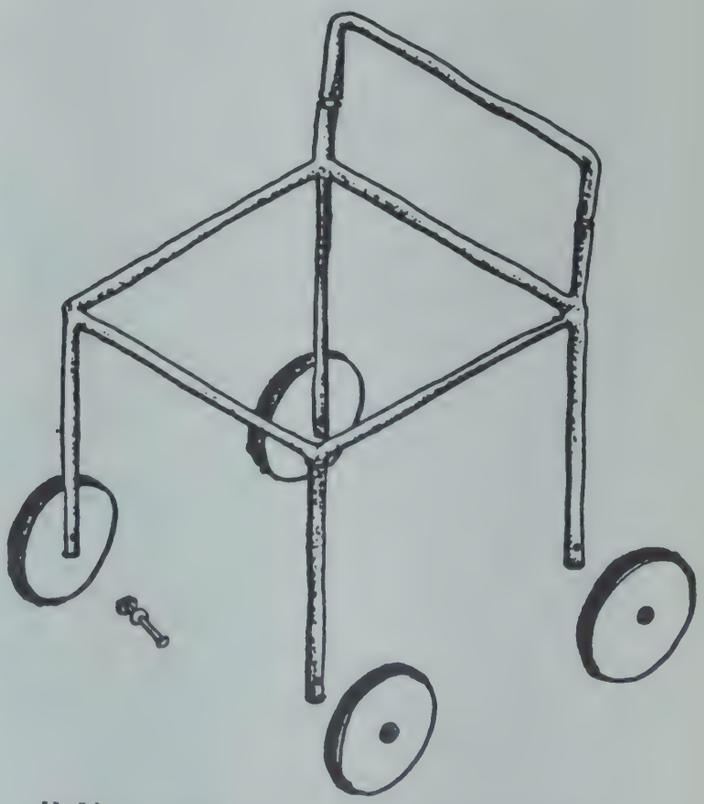
4 Walking frame with wheels made from metal tube





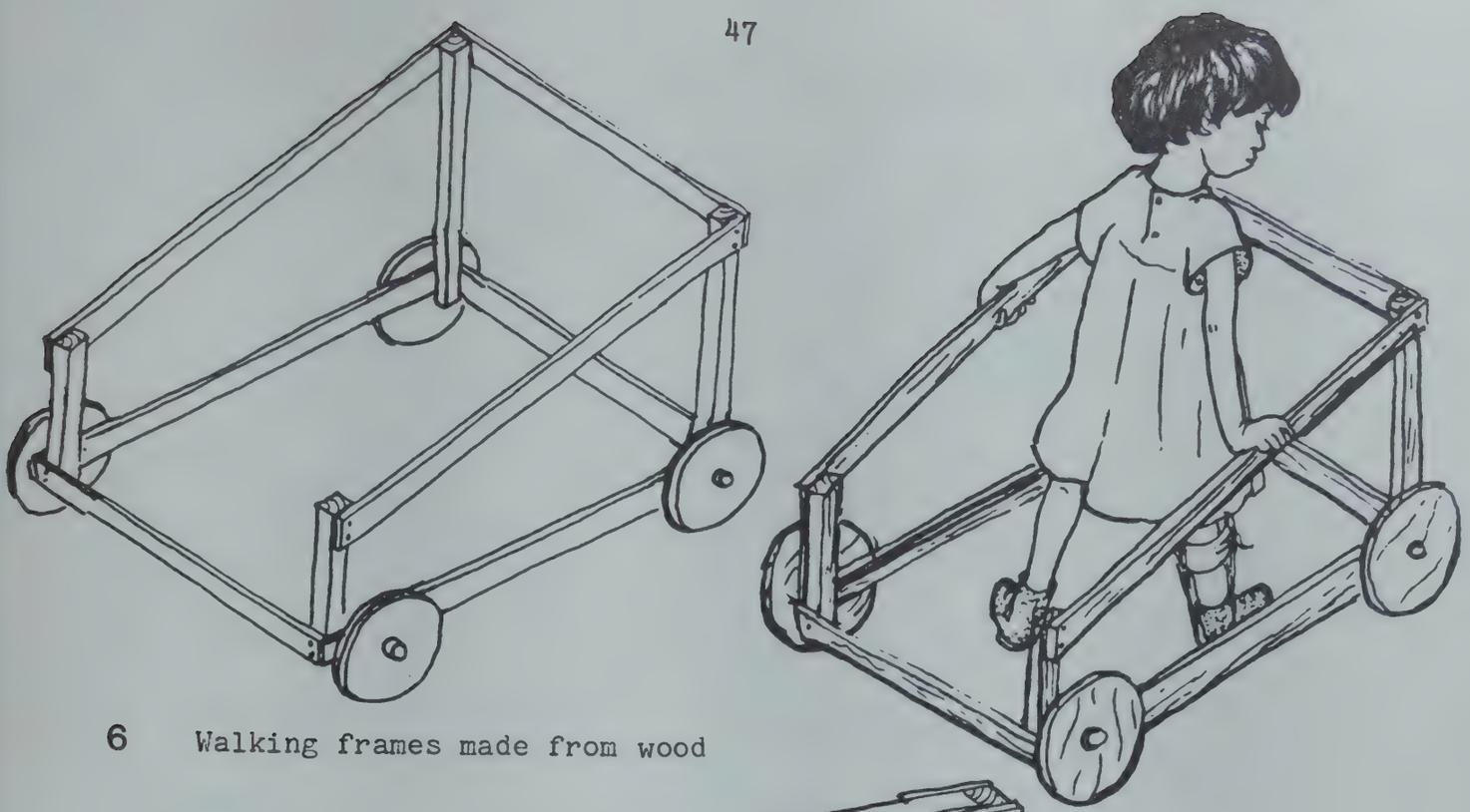


A firm cloth has been added to this walker.

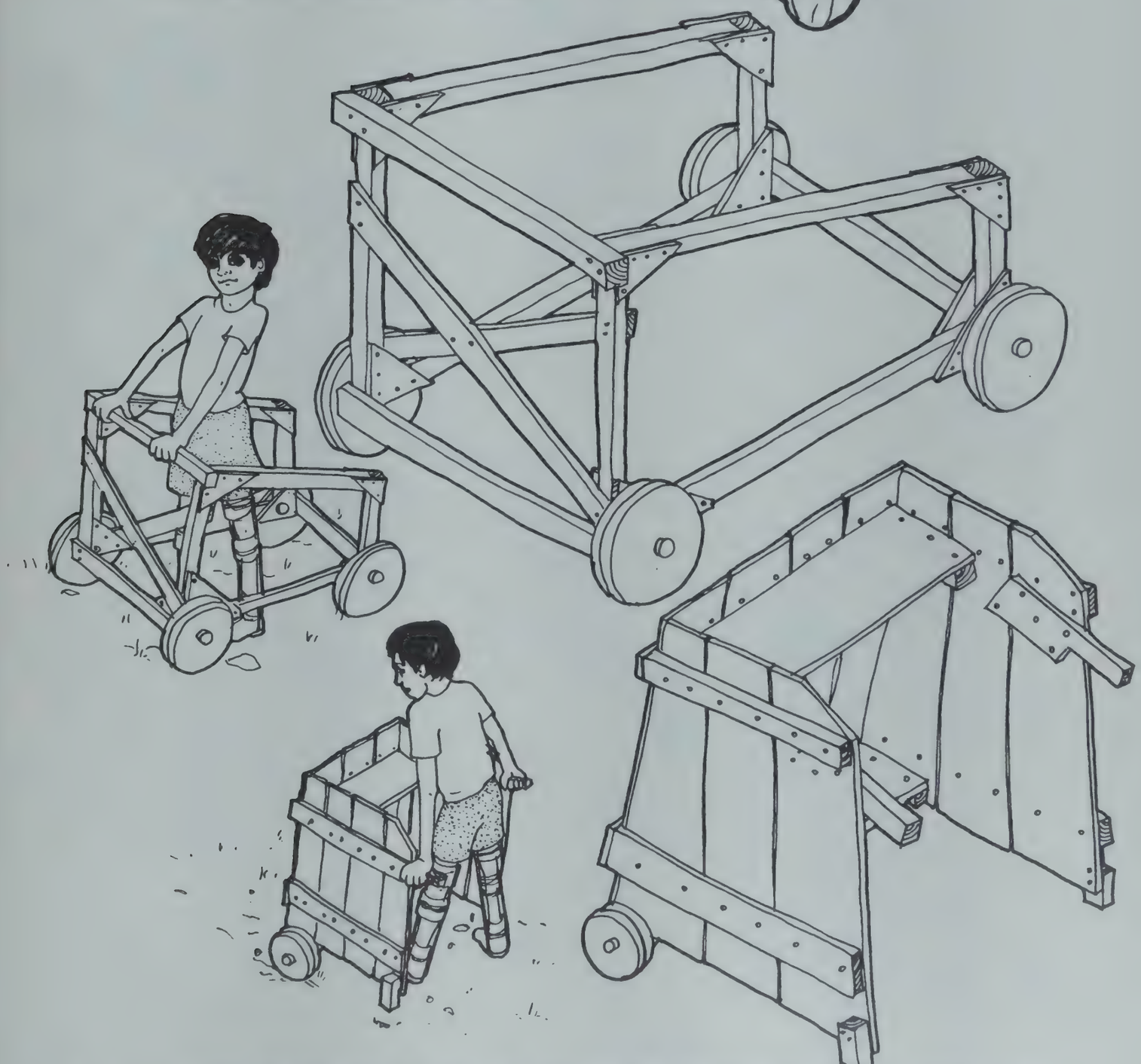


5 Walking frame made from a chair

A metal frame from a chair has been used to make this walker. Wheels have been attached to make it more mobile. This should only be used on level ground or else the wheels may carry the person away.



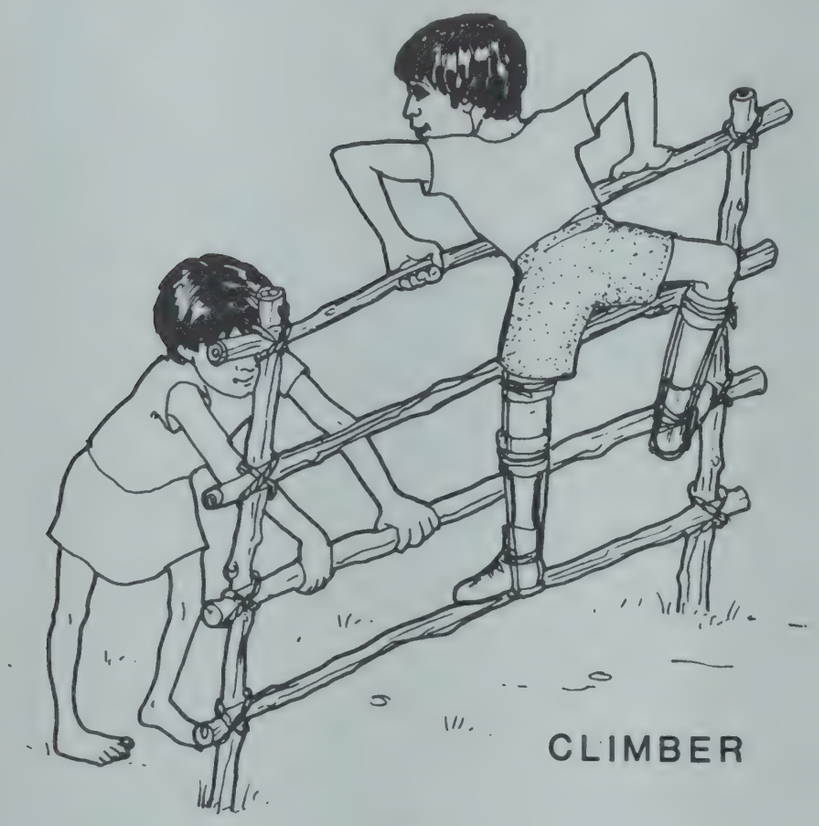
6 Walking frames made from wood



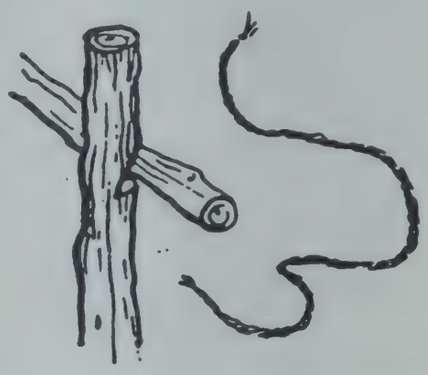
7 This walker has a tray so that light materials can be transported.

AIDS TO HELP WALKING PRACTICE

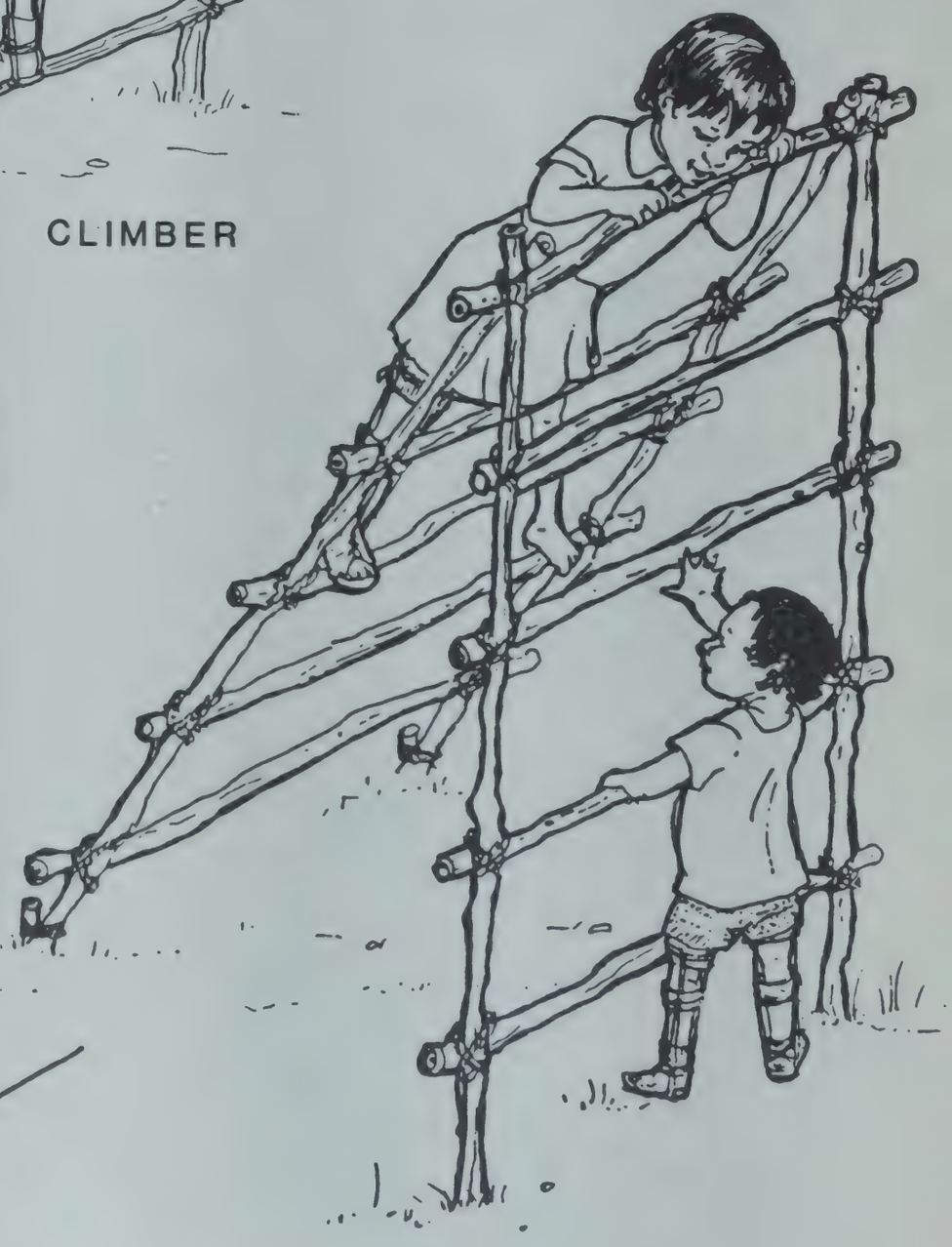
A variety of ideas are shown to help people with weak legs practise walking and to build up their strength and confidence. All the equipment must be fixed firmly and should not shake when in use.

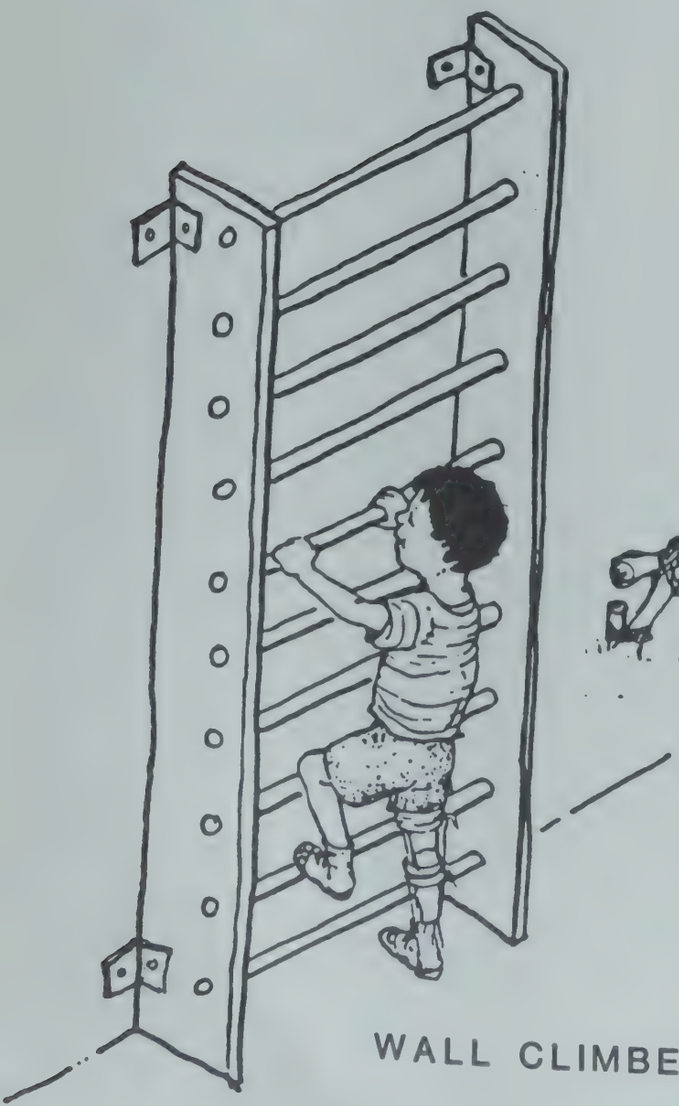


CLIMBER



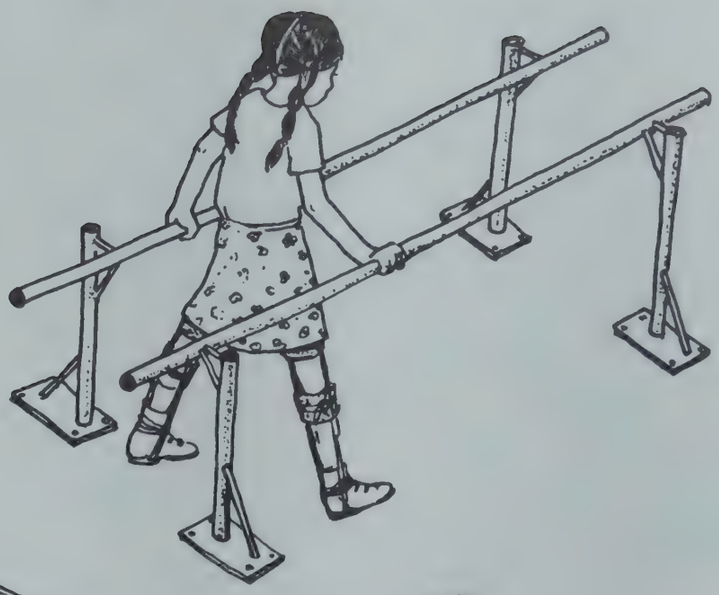
Cut notch to stop slipping

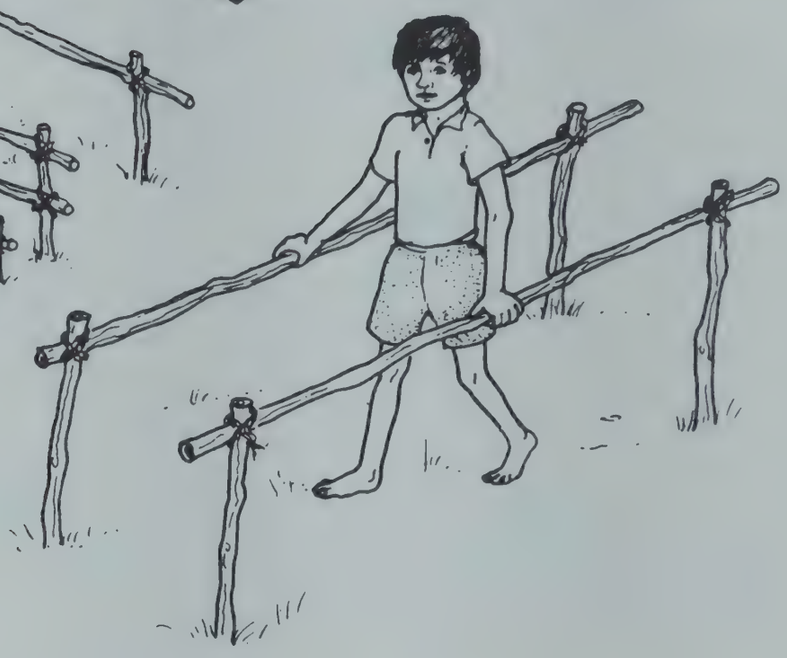




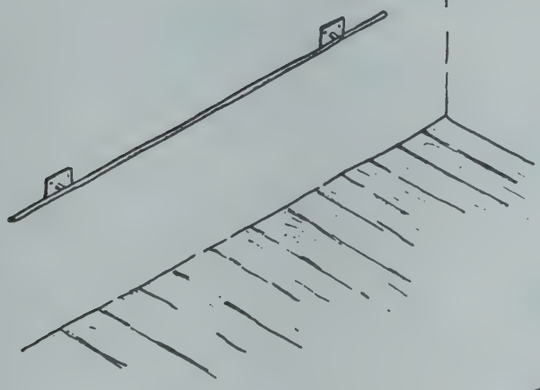
WALL CLIMBER

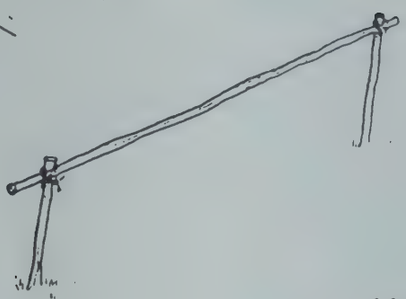
PARALLEL BARS





WALL WALKING BAR

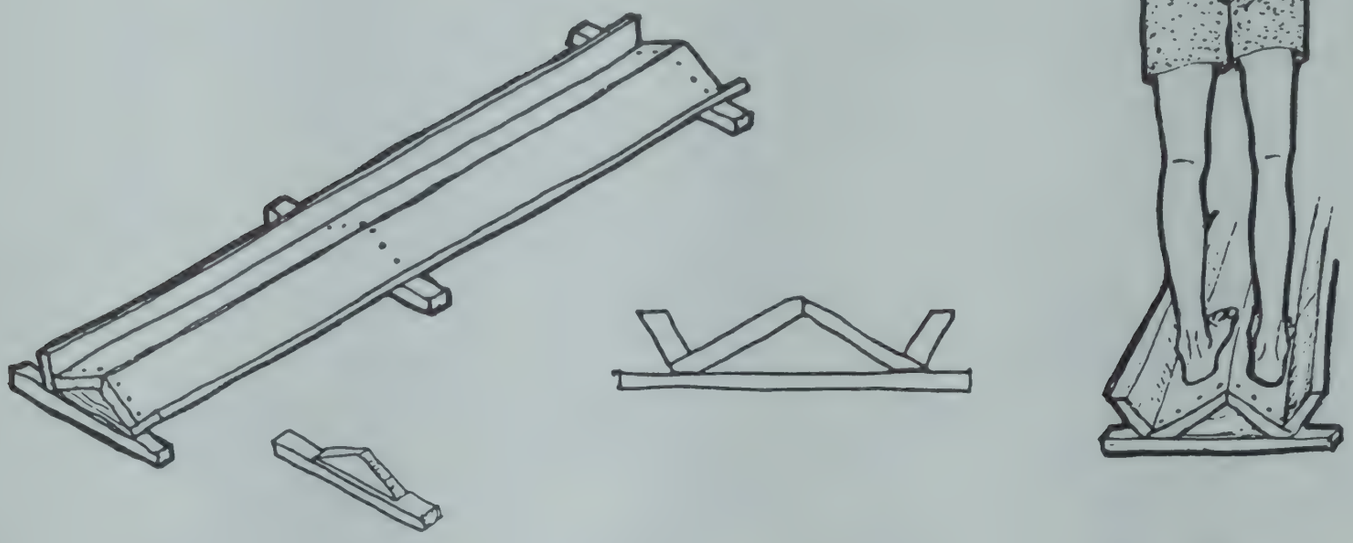


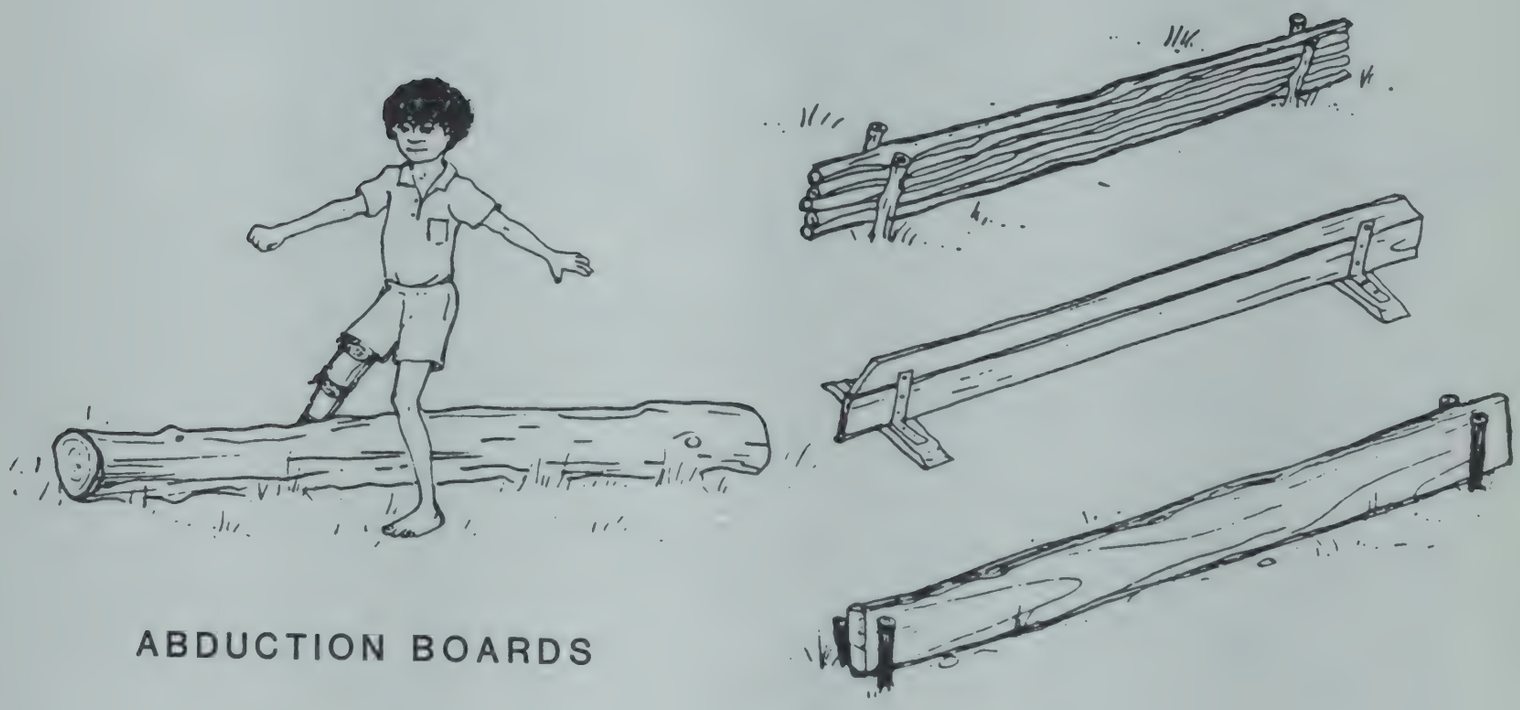


HAND RAILS

rail can lead from hut to toilet

SLANTED WALKING BOARD- FIXED ANGLE



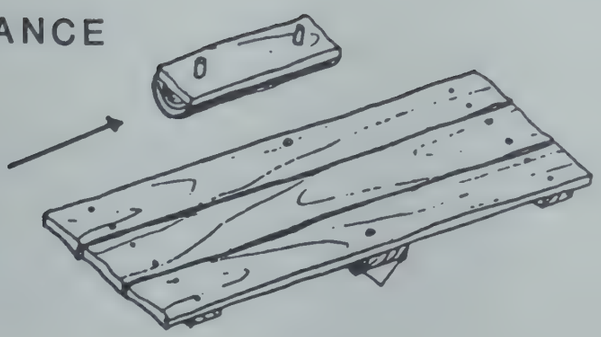


ABDUCTION BOARDS

STEPPING STONES

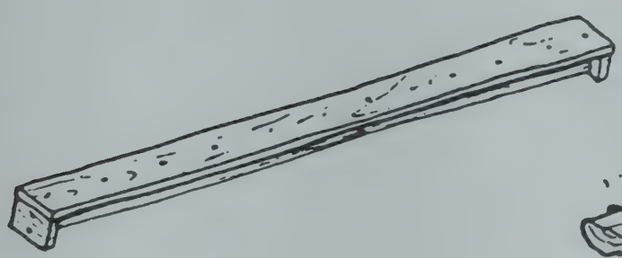
ROCKER BALANCE

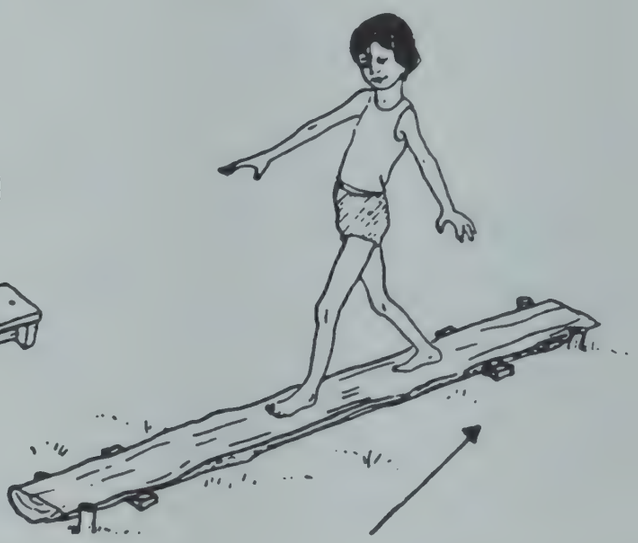
A range of sections



Sprinkle sand onto wet paint to stop slipping.

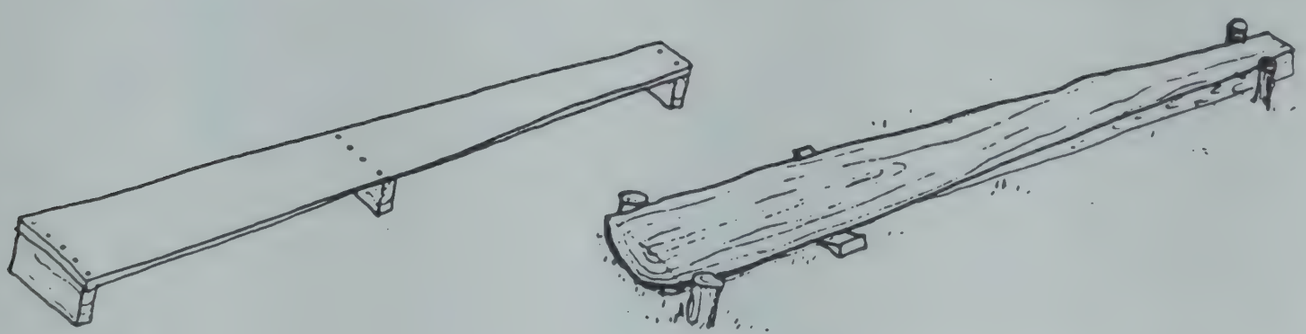
BALANCE BEAM





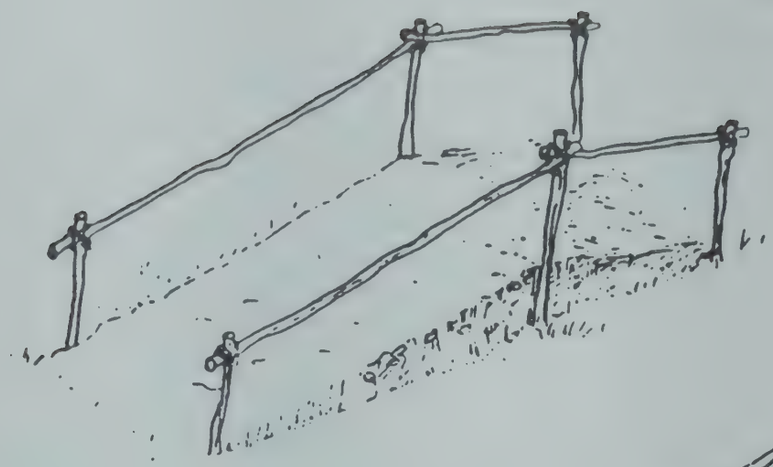
TAPERED BEAM

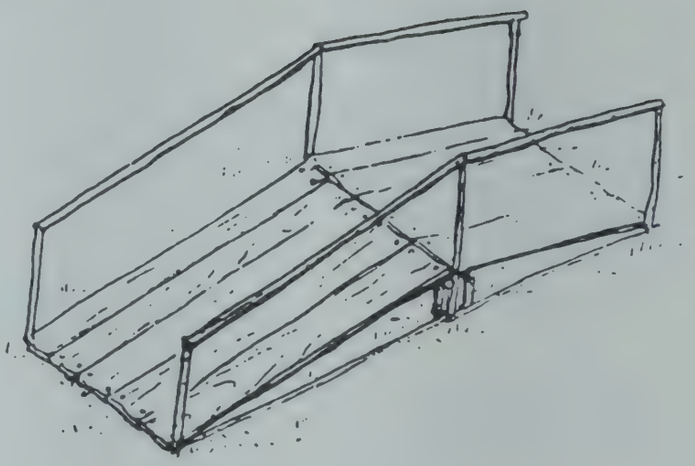
Wedges stop slipping

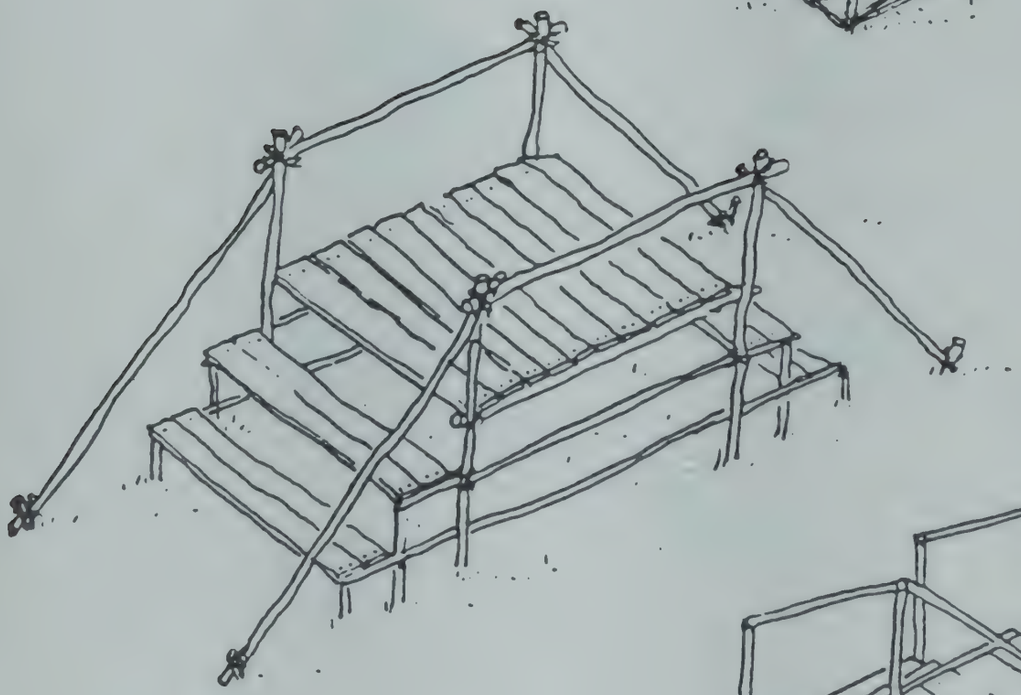


INCLINED BEAM

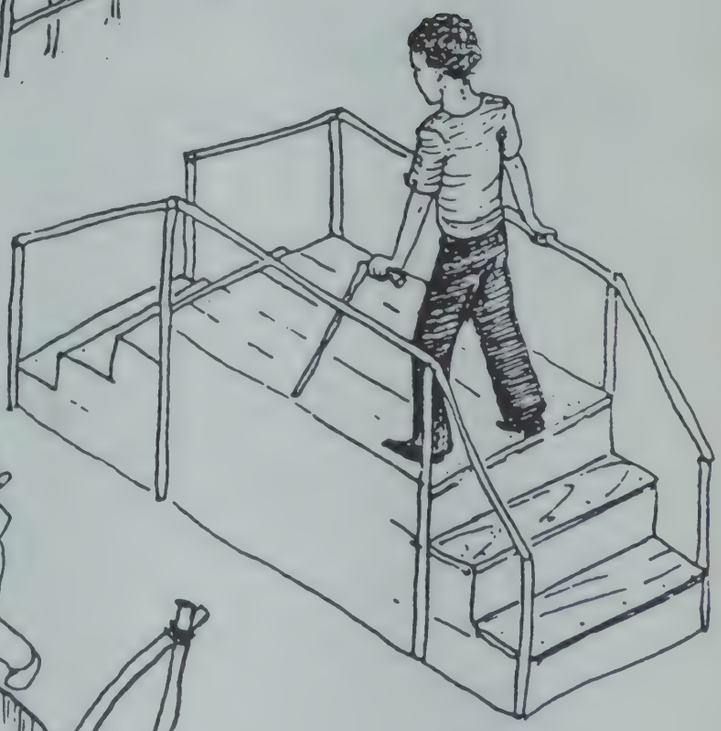
SLOPES







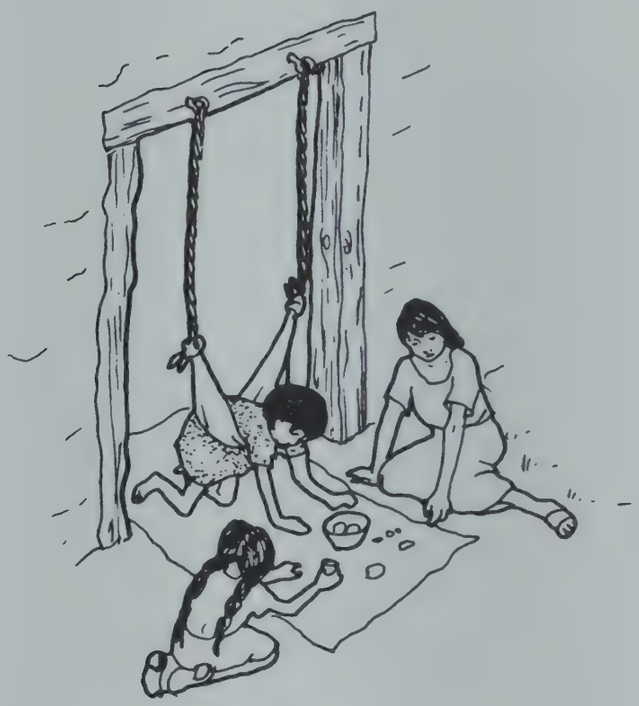
STEPS

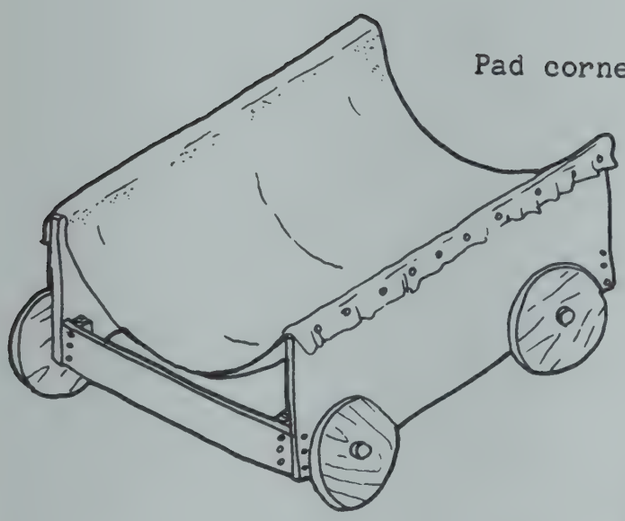


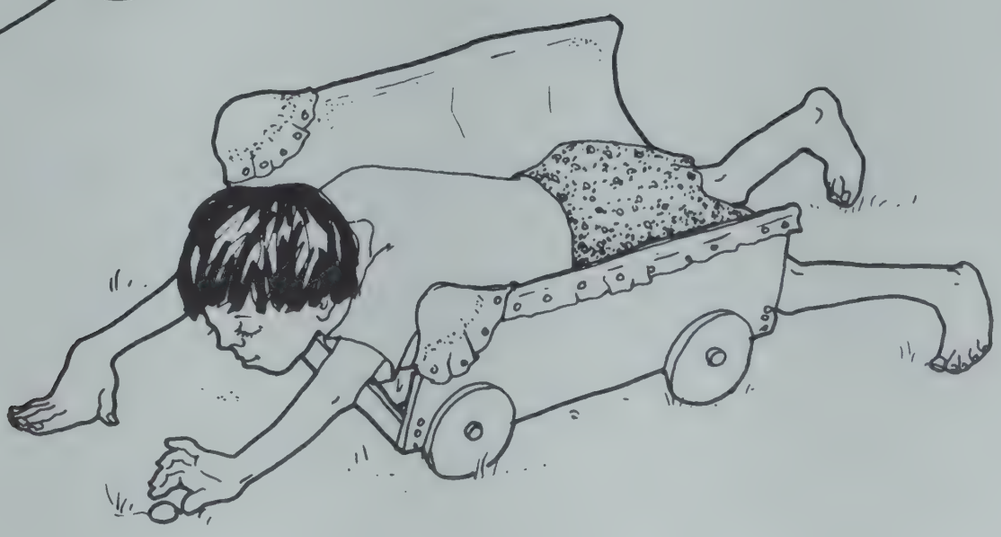
STEPS DUG IN GROUND

SUPPORT AND CRAWLING AIDS

1 A sling may be used to encourage some children to crawl. The medical adviser will be able to give you guidance about the amount of support the child will need, but you will need to use a wide spread for the sling.







2 A crawler with wheels will help a child who normally creeps around the ground to move using straight arms to push along.

NOTES

PART THREE

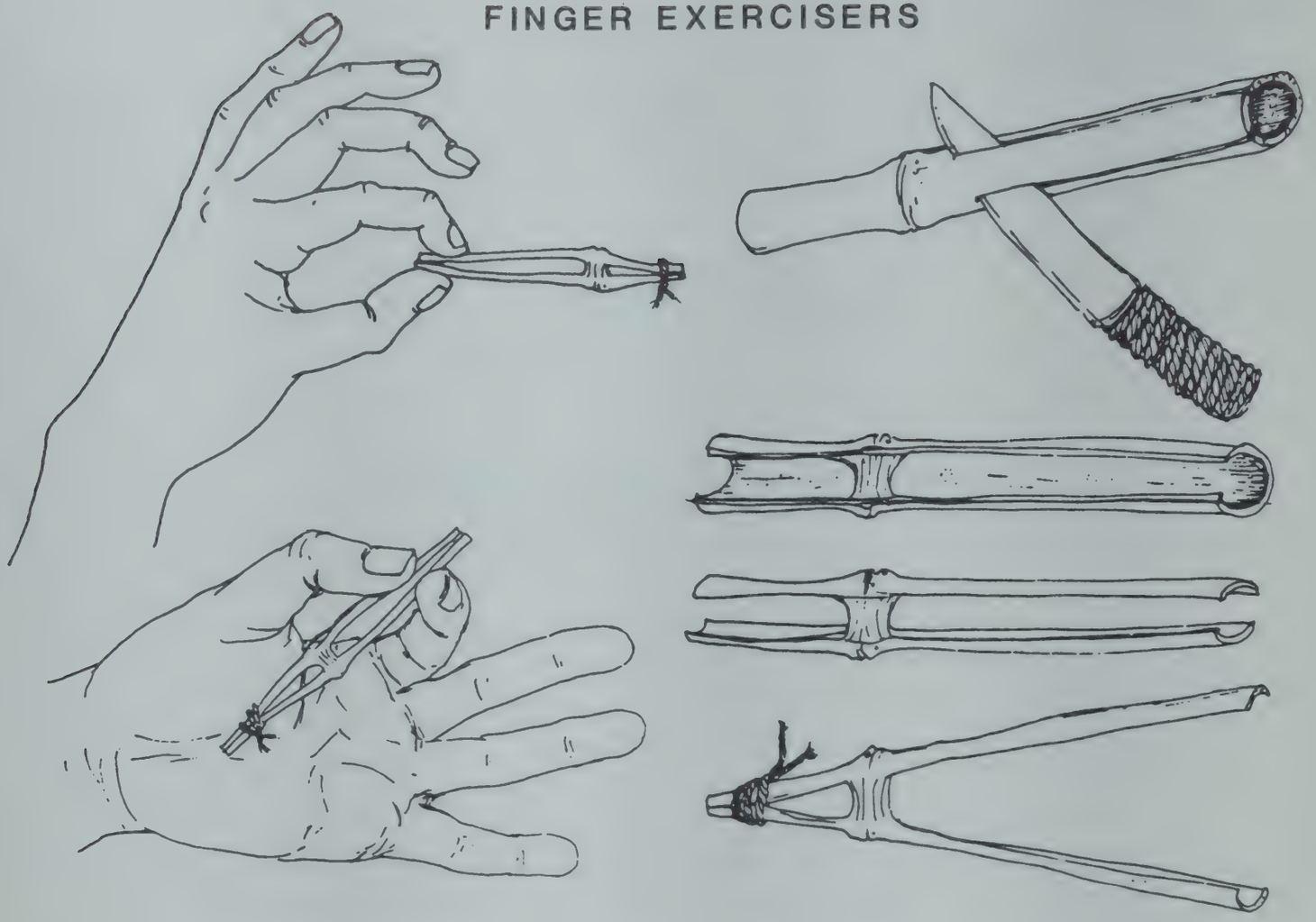
Physiotherapy Aids

This part of the book shows how to make simple aids for exercising different parts of the body. The aids can be used in hospital or at home. A person must continue with the exercises after they have left hospital. It is important to measure progress regularly - your medical adviser will show you how to do this.

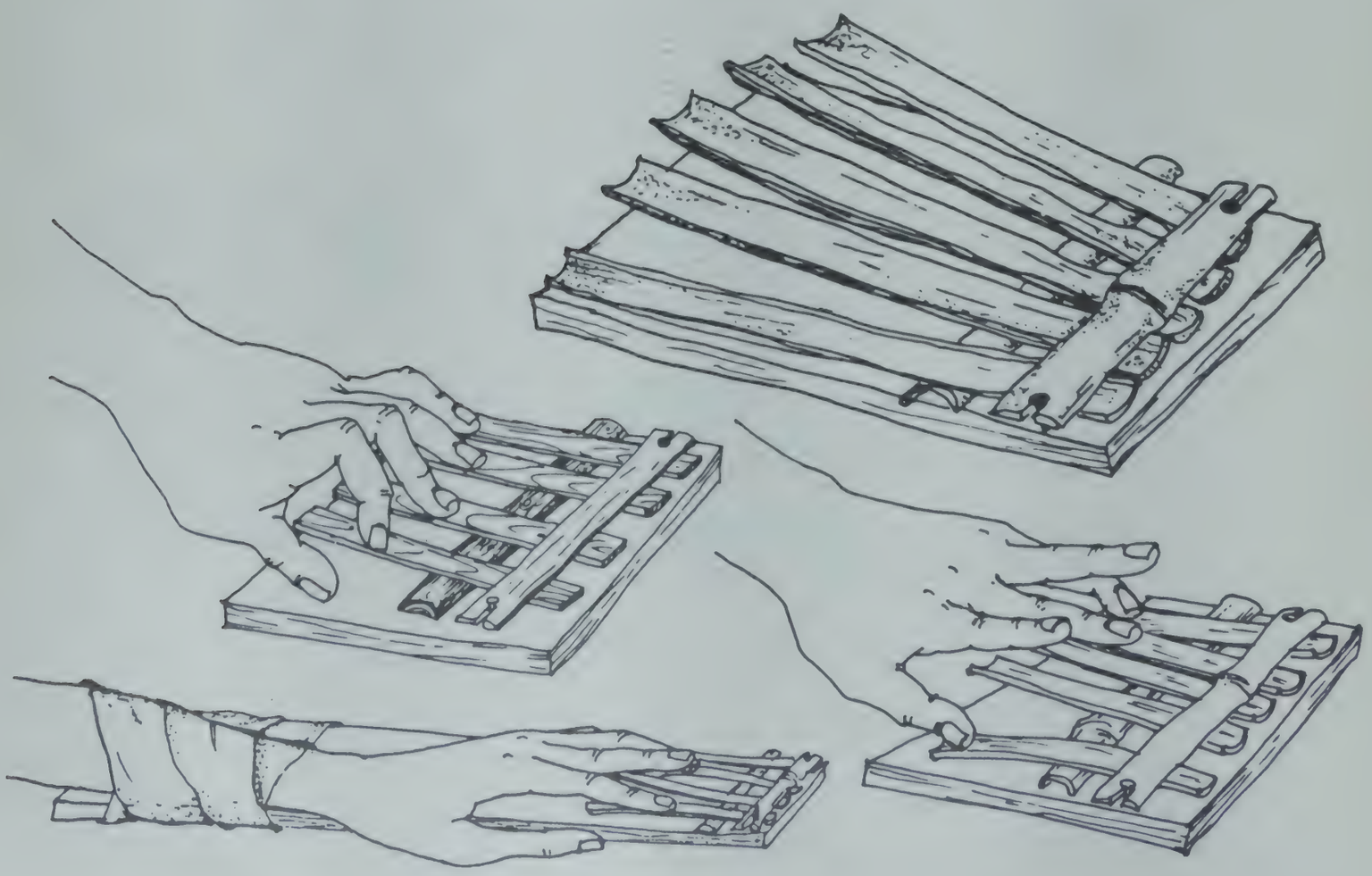
It is important that whoever chooses the aid understands the right treatment for each medical condition. The maker must work closely with a medical adviser so that they can adapt aids to suit each person.

Try to make the exercises fun and/or perform a useful function, then they are much more likely to be used. Few people like doing exercises for the sake of them.

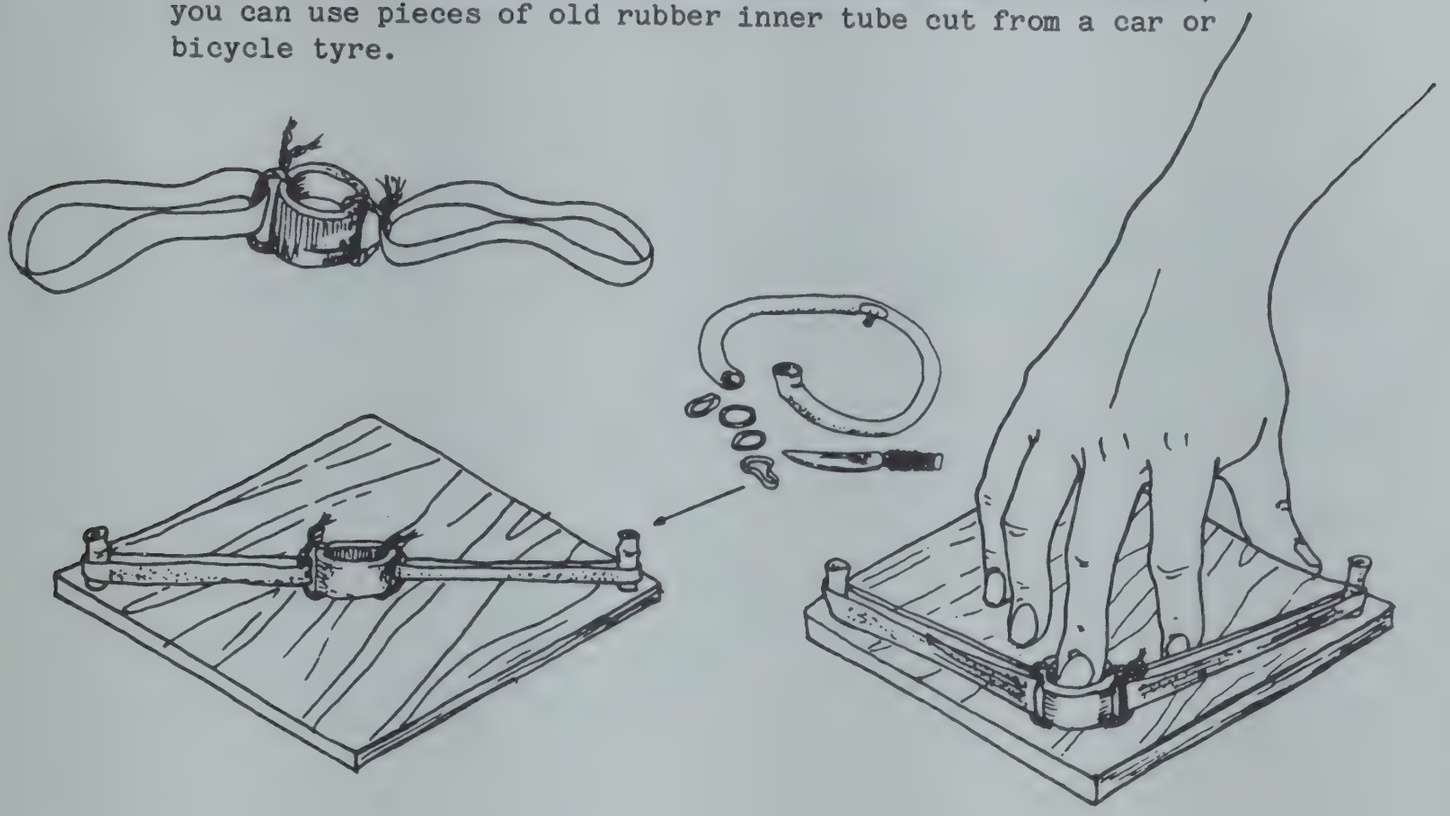
FINGER EXERCISERS



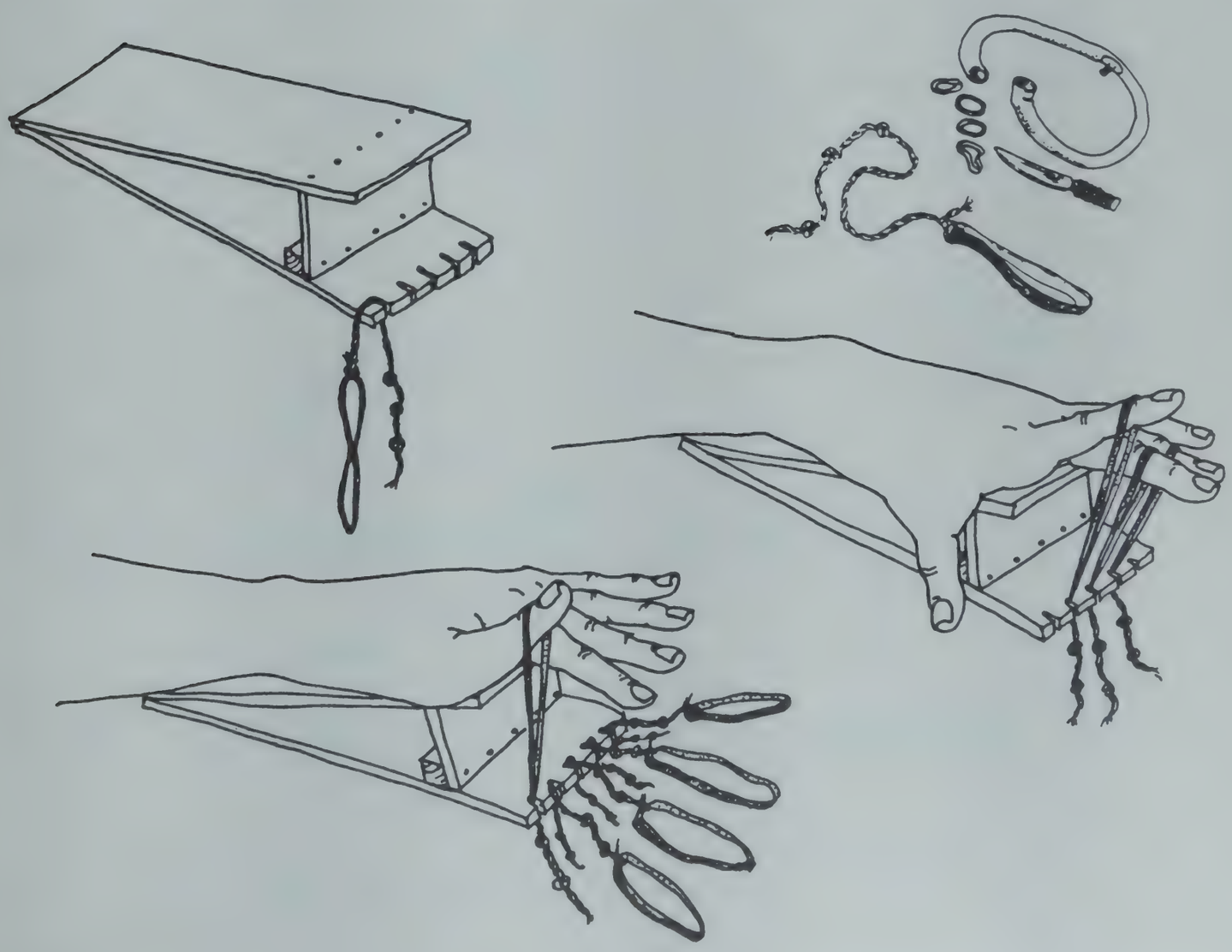
This helps to strengthen the movement of the fingers and thumb.



When you make exercisers which need a material that will stretch, you can use pieces of old rubber inner tube cut from a car or bicycle tyre.

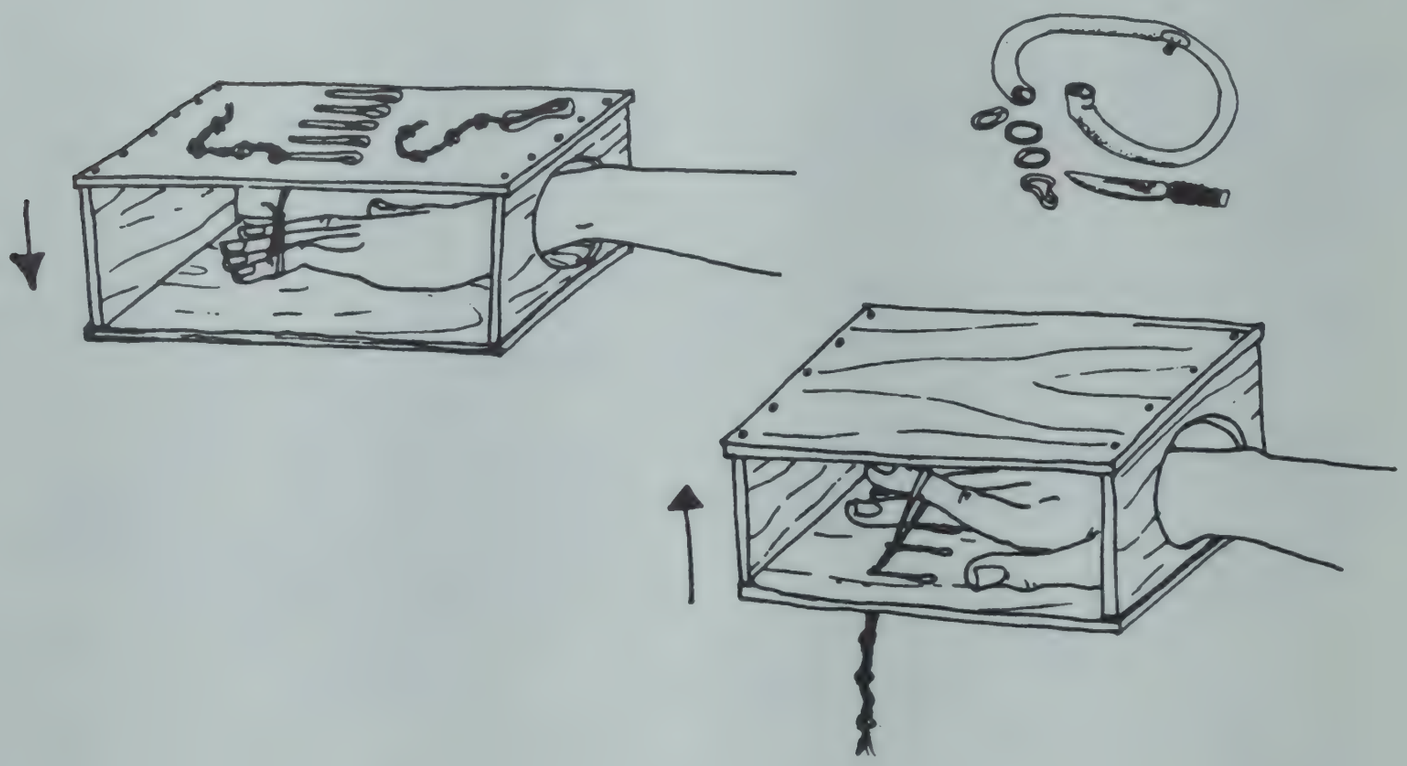


This helps to strengthen individual finger muscles.

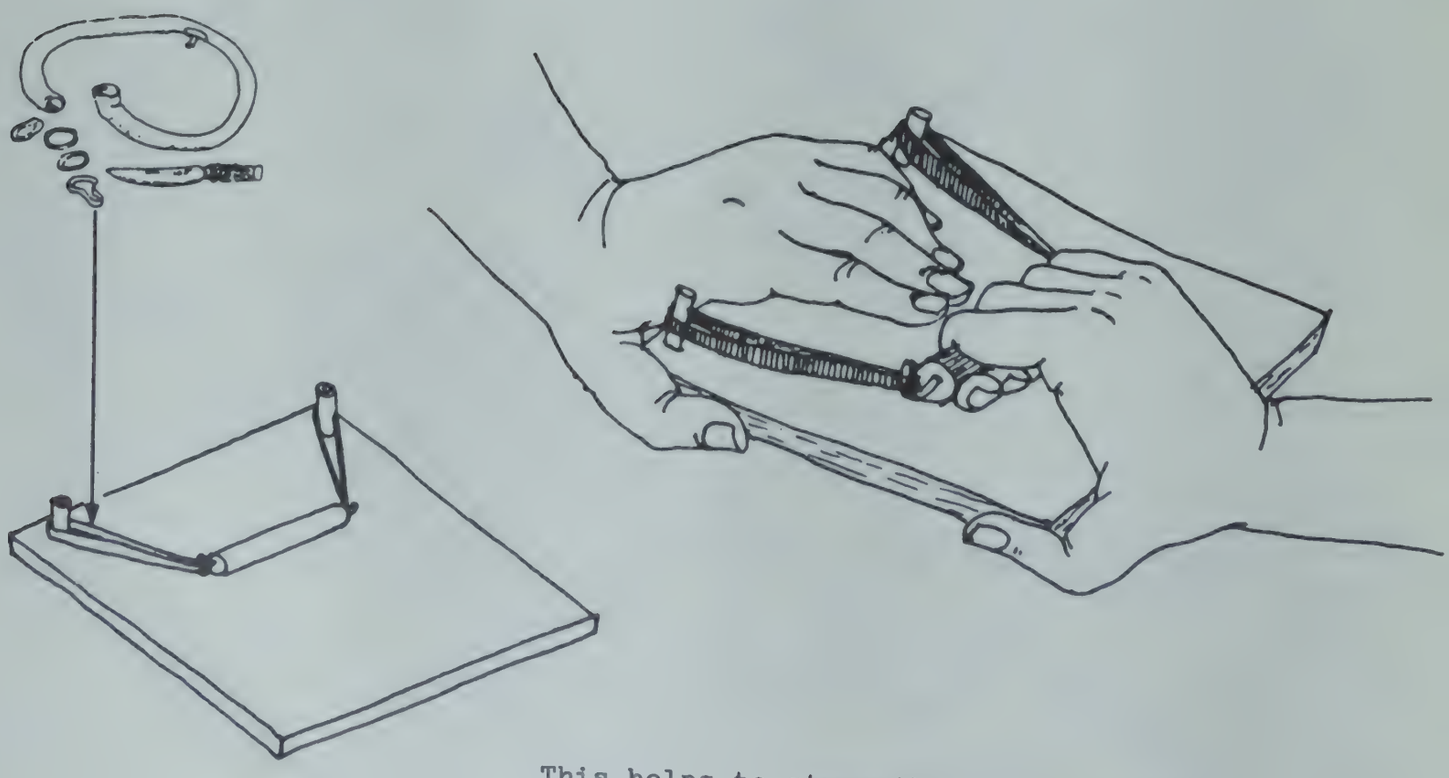


FINGER EXERCISER

This helps to strengthen and improve the movement of the fingers.



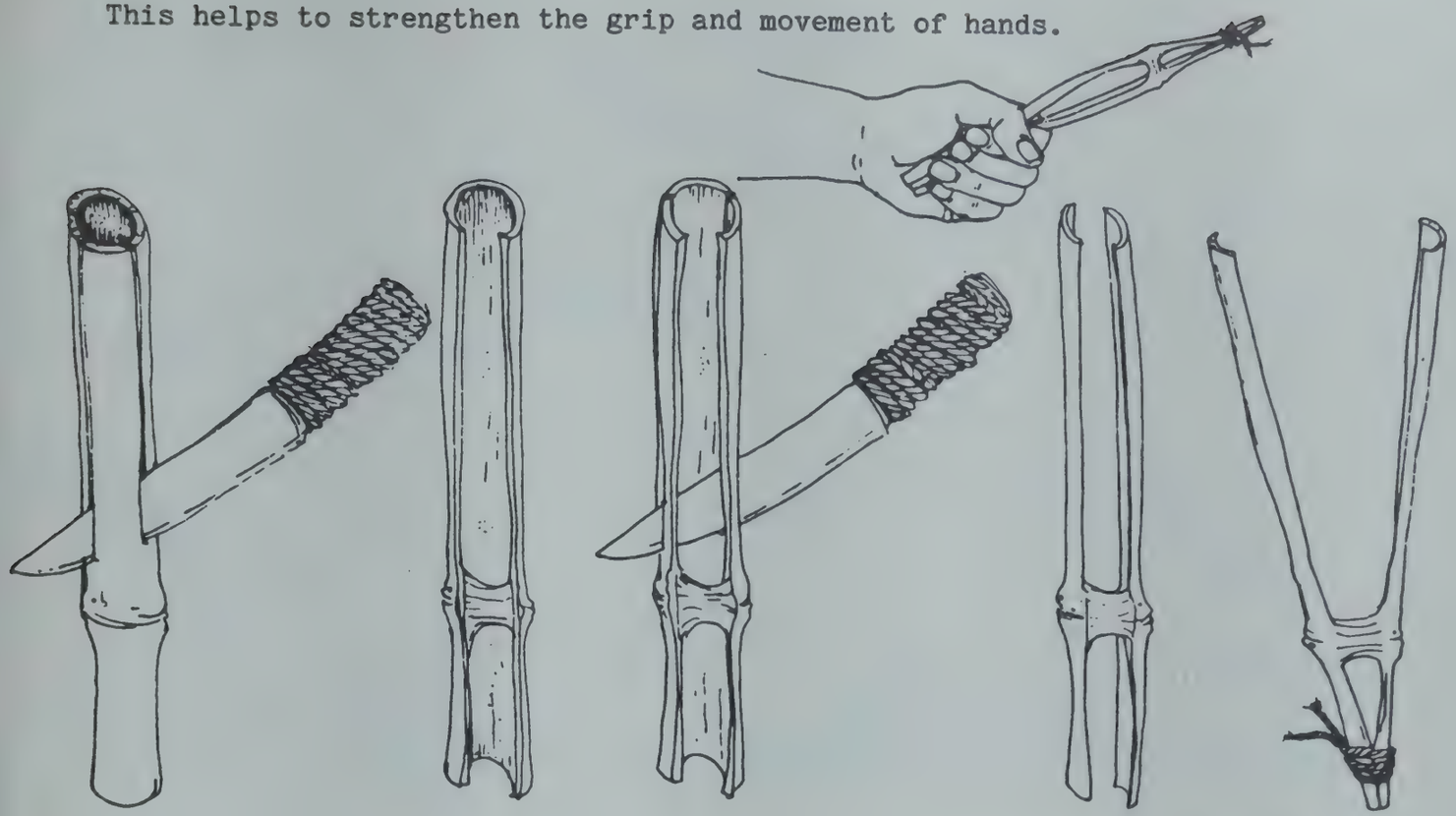
HAND AND FINGER EXERCISER



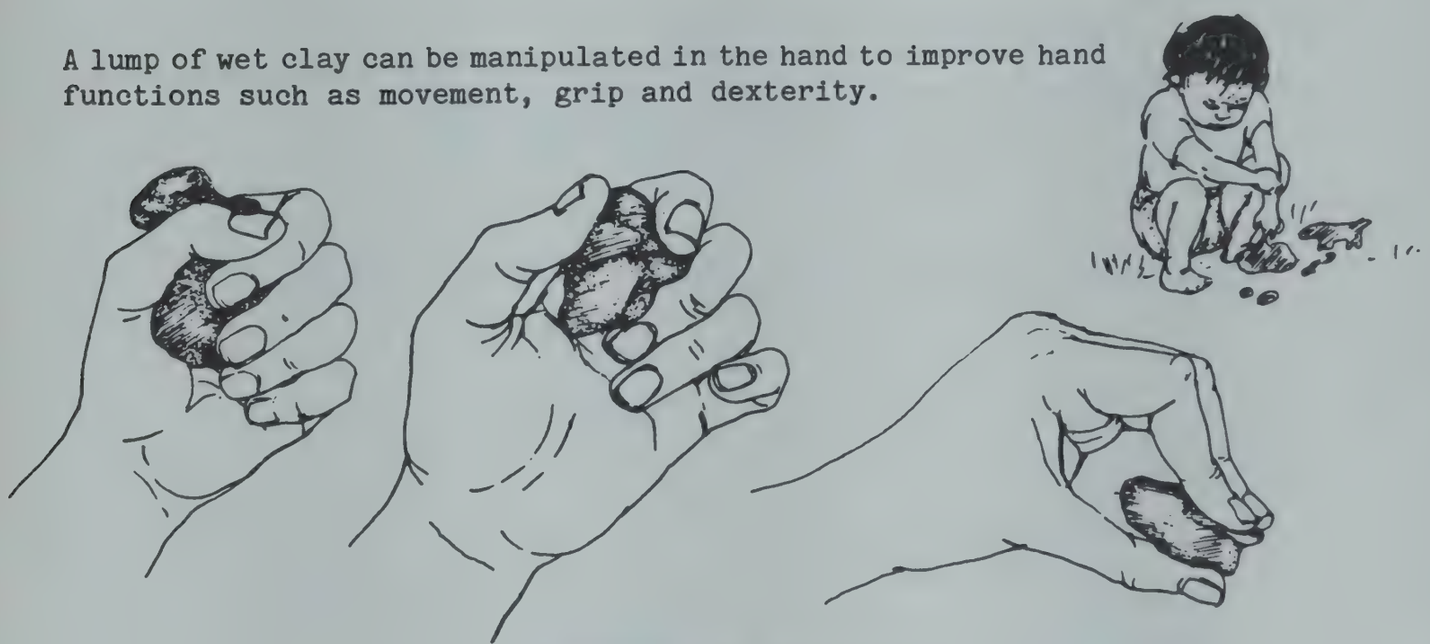
This helps to strengthen the hand grip.

HAND EXERCISERS

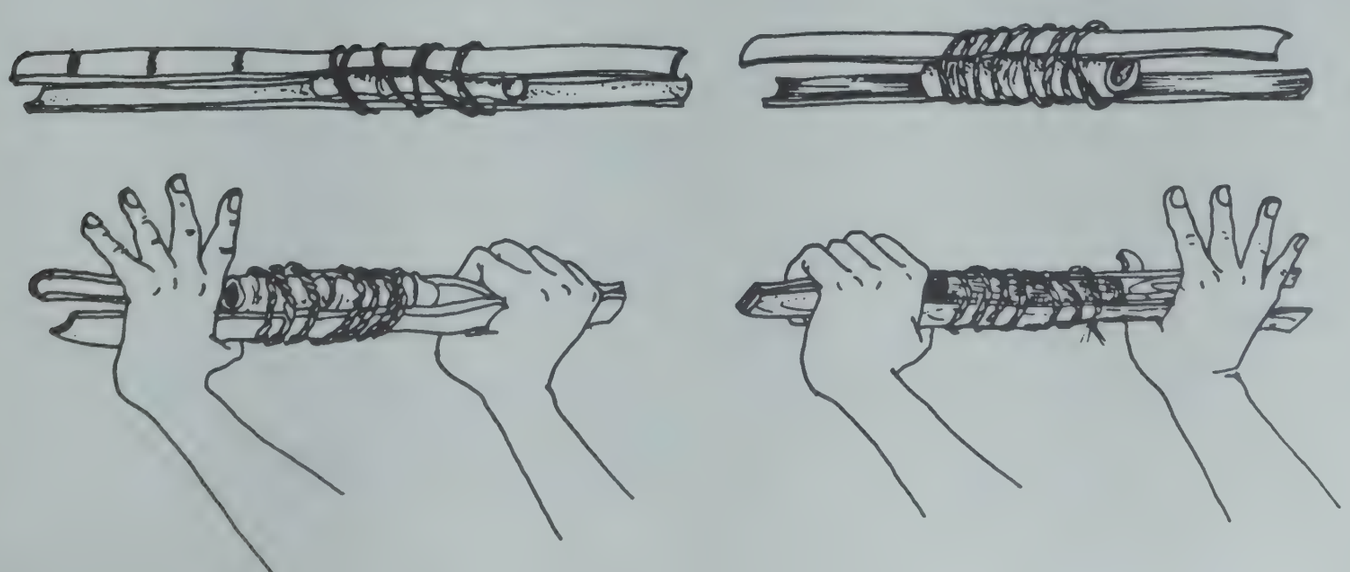
This helps to strengthen the grip and movement of hands.



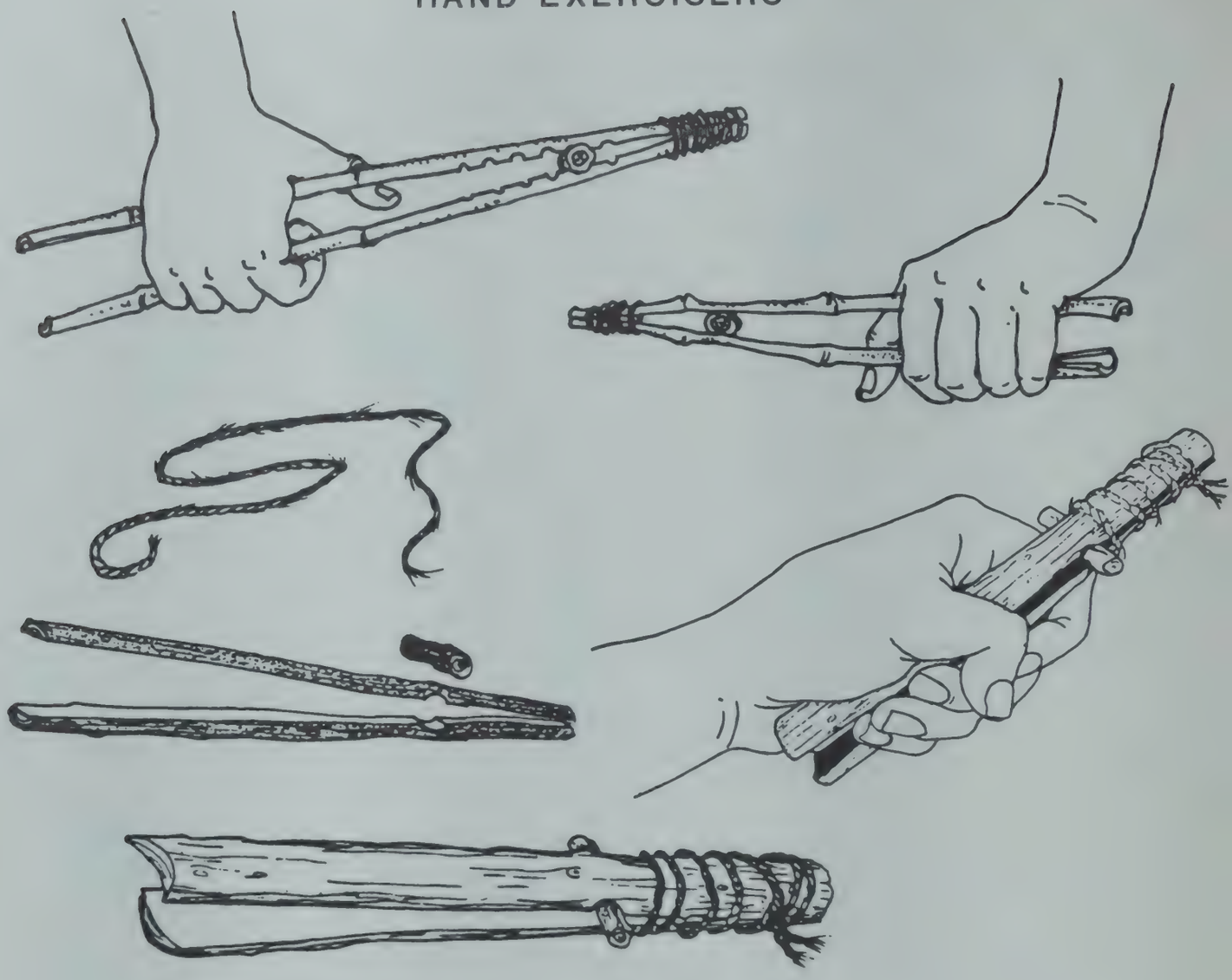
A lump of wet clay can be manipulated in the hand to improve hand functions such as movement, grip and dexterity.



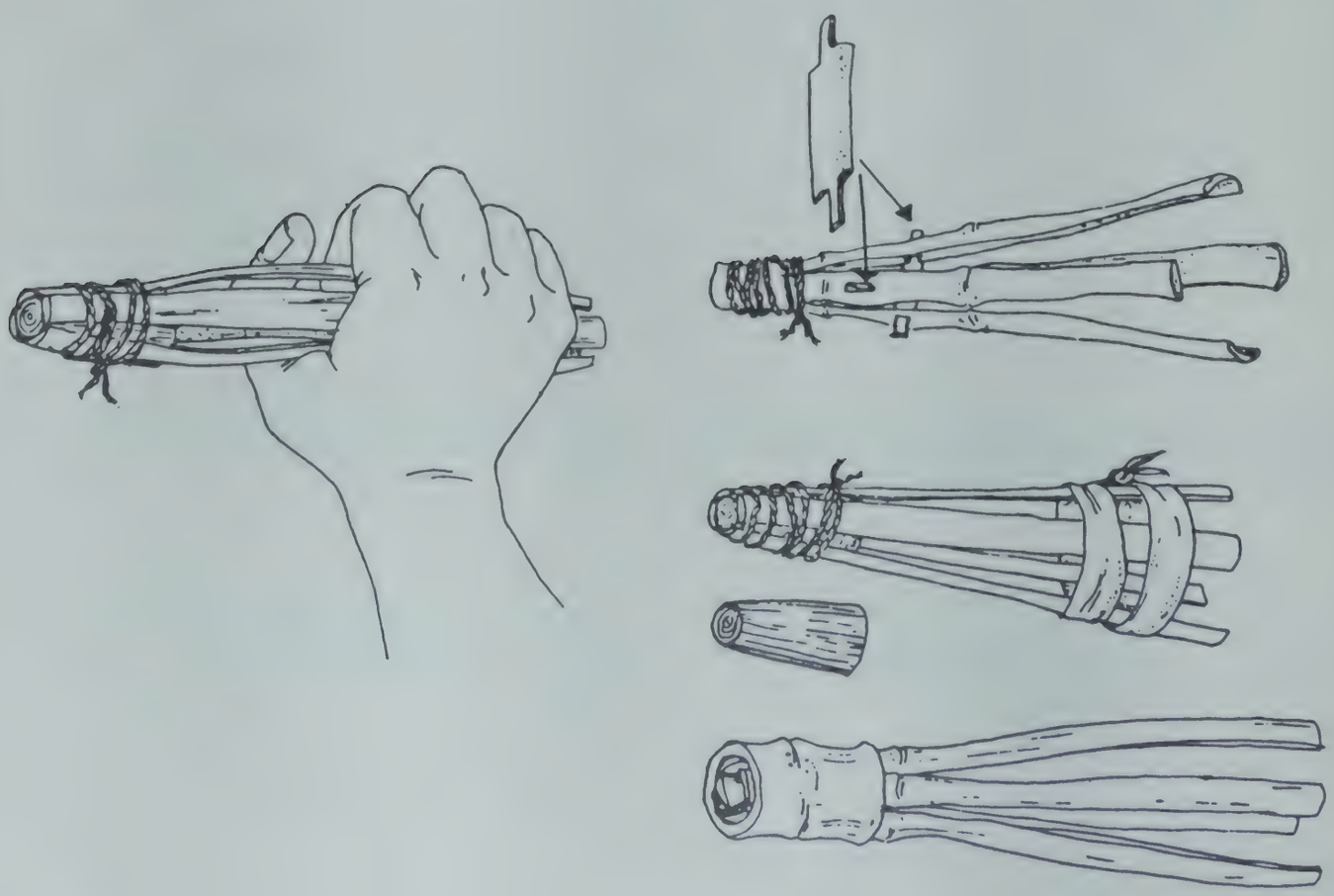
This helps improve the hand grip.



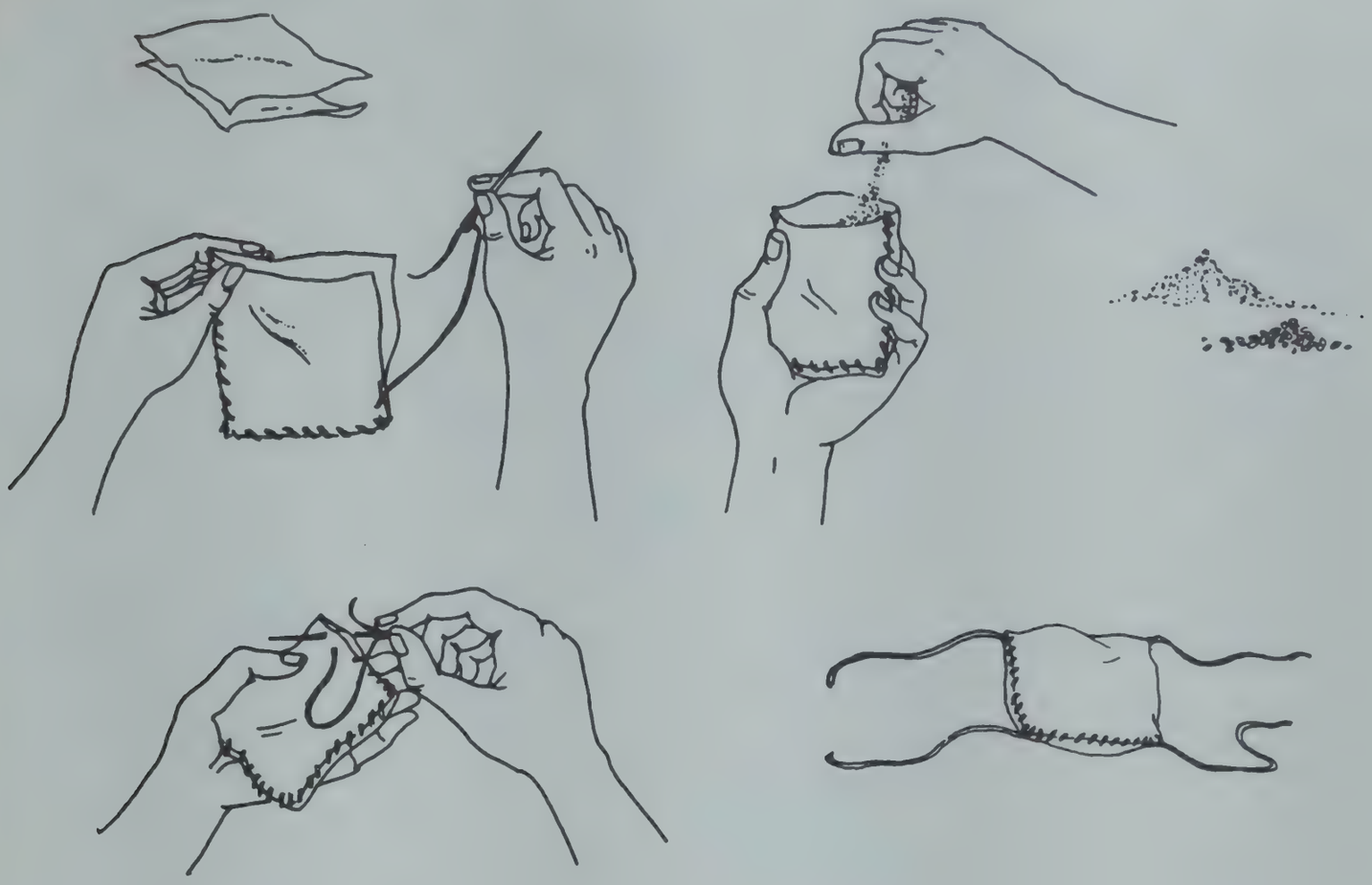
HAND EXERCISERS



This helps to improve the strength of the finger movements and grip.

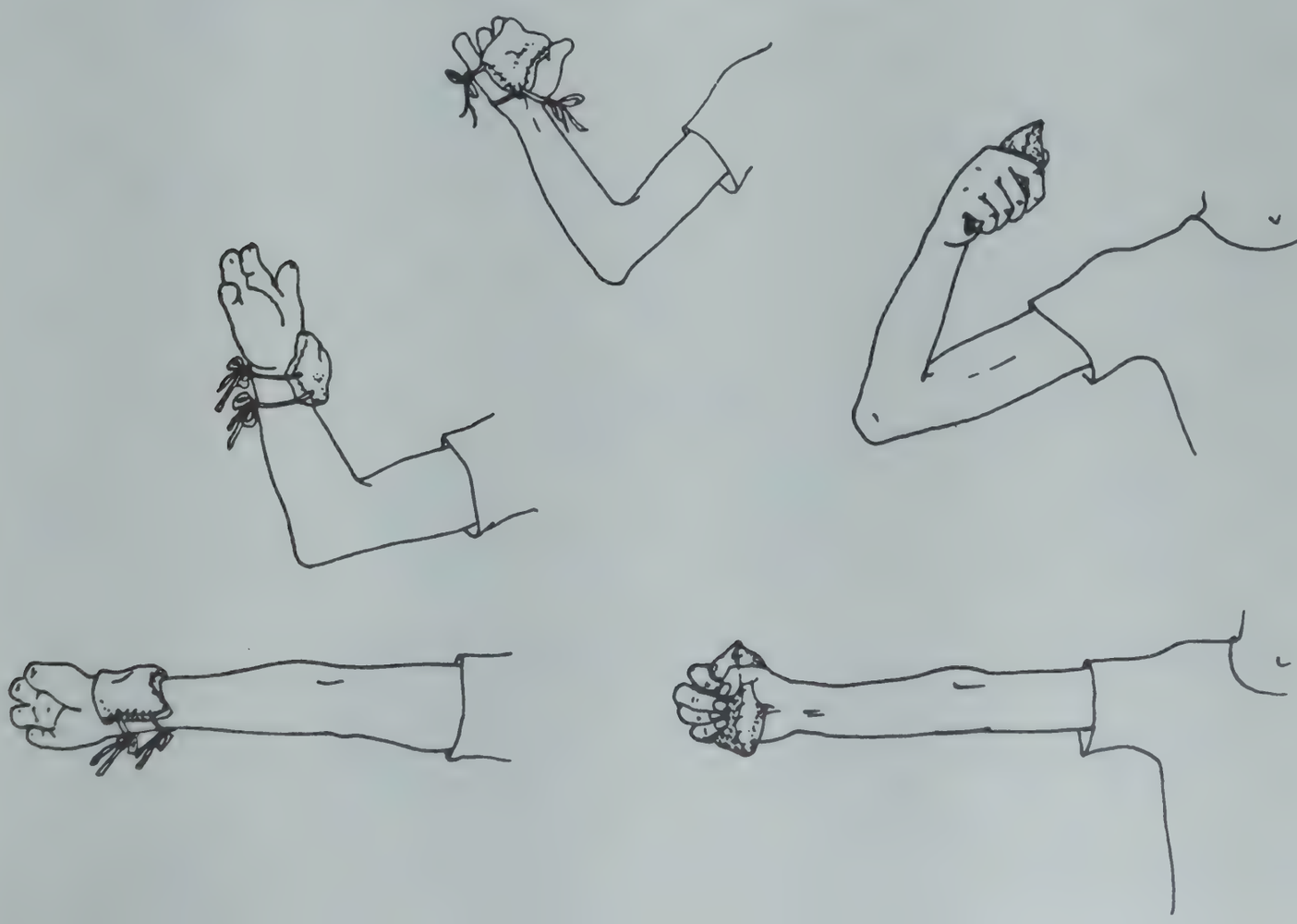


You can make a weight by filling a piece of cloth with sand, clay or stones.

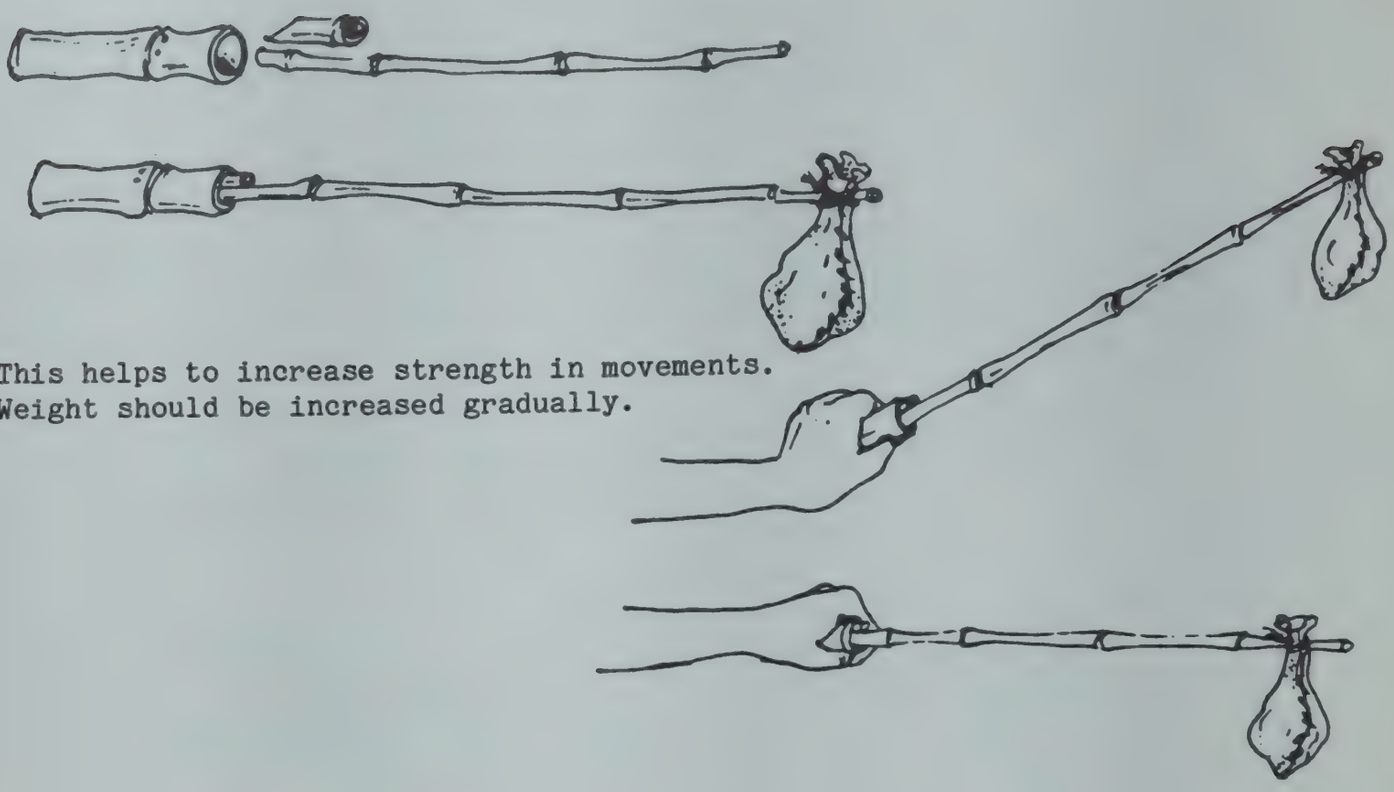


WEIGHTED ARM EXERCISER

This helps to strengthen wrist and arm movements.
This also helps reduce involuntary movements.



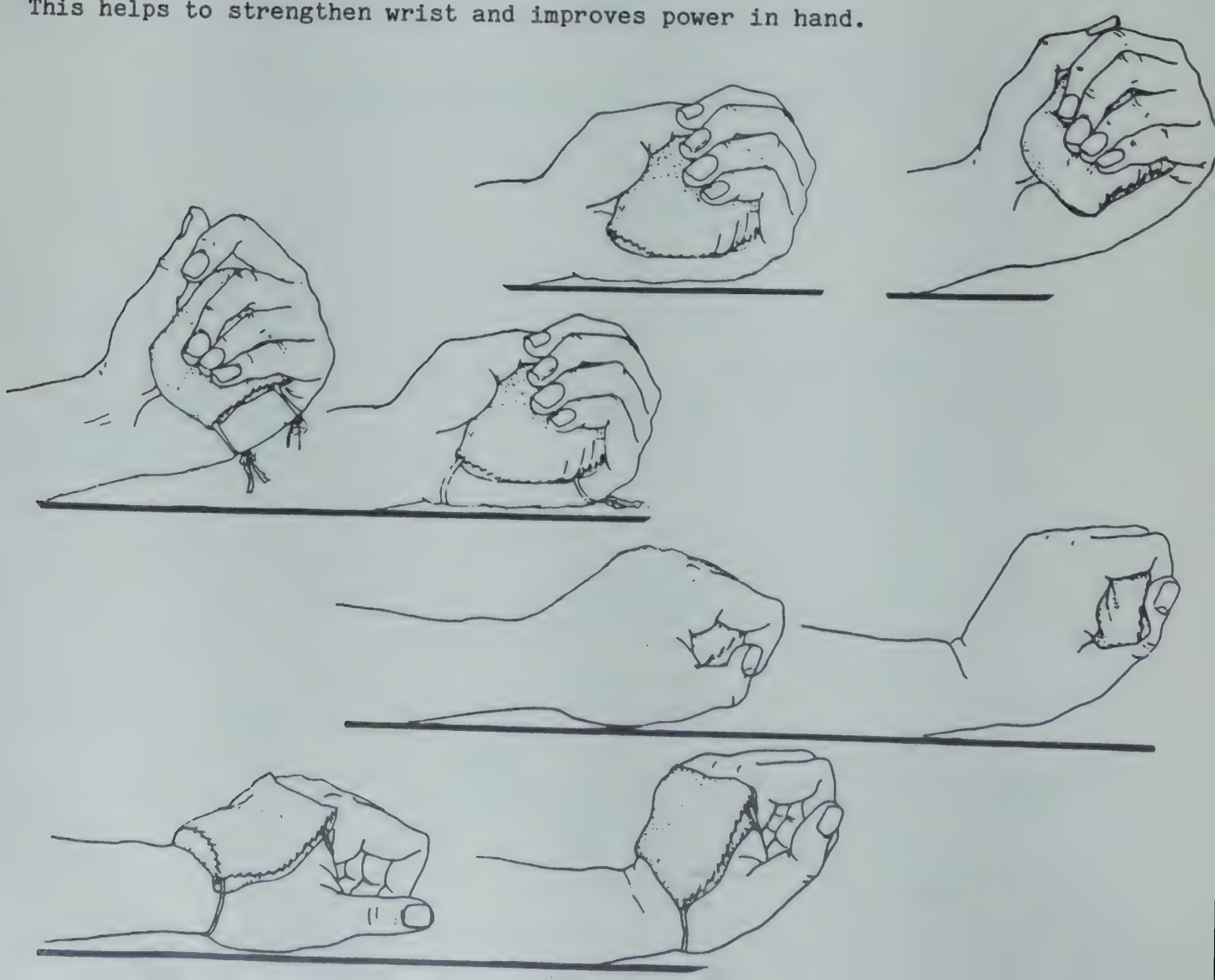
WRIST AND ARM EXERCISER



This helps to increase strength in movements.
Weight should be increased gradually.

HAND EXERCISER

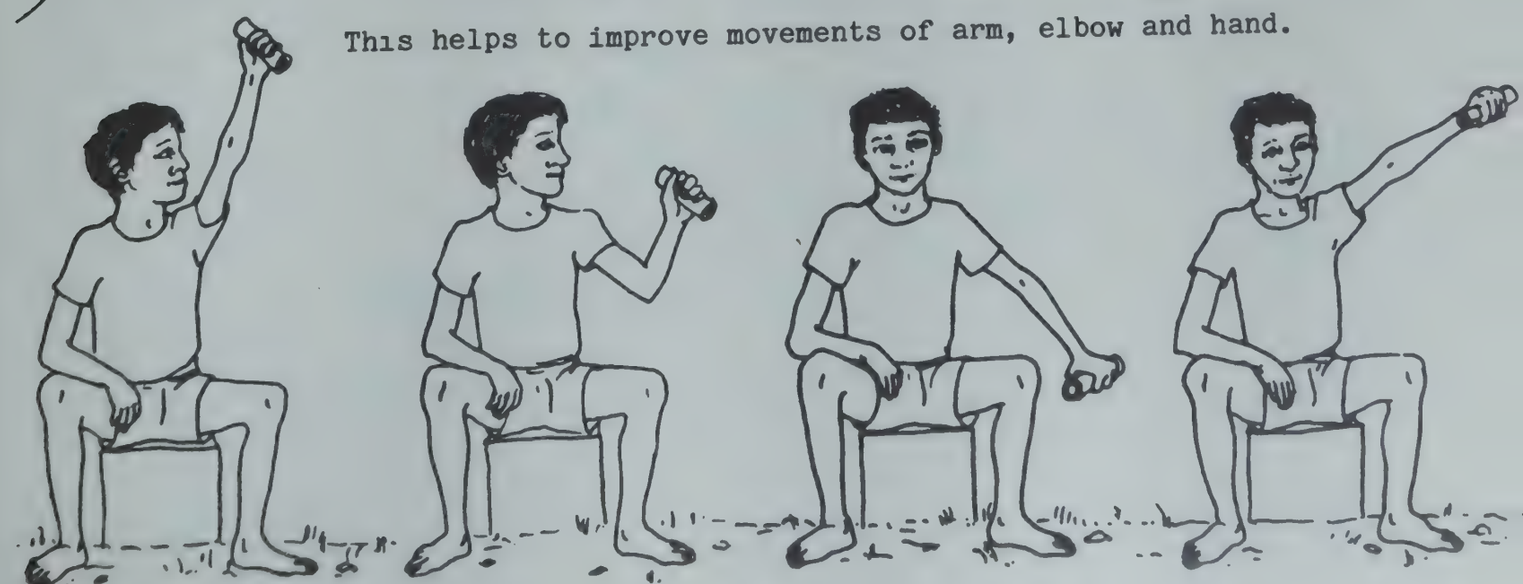
This helps to strengthen wrist and improves power in hand.



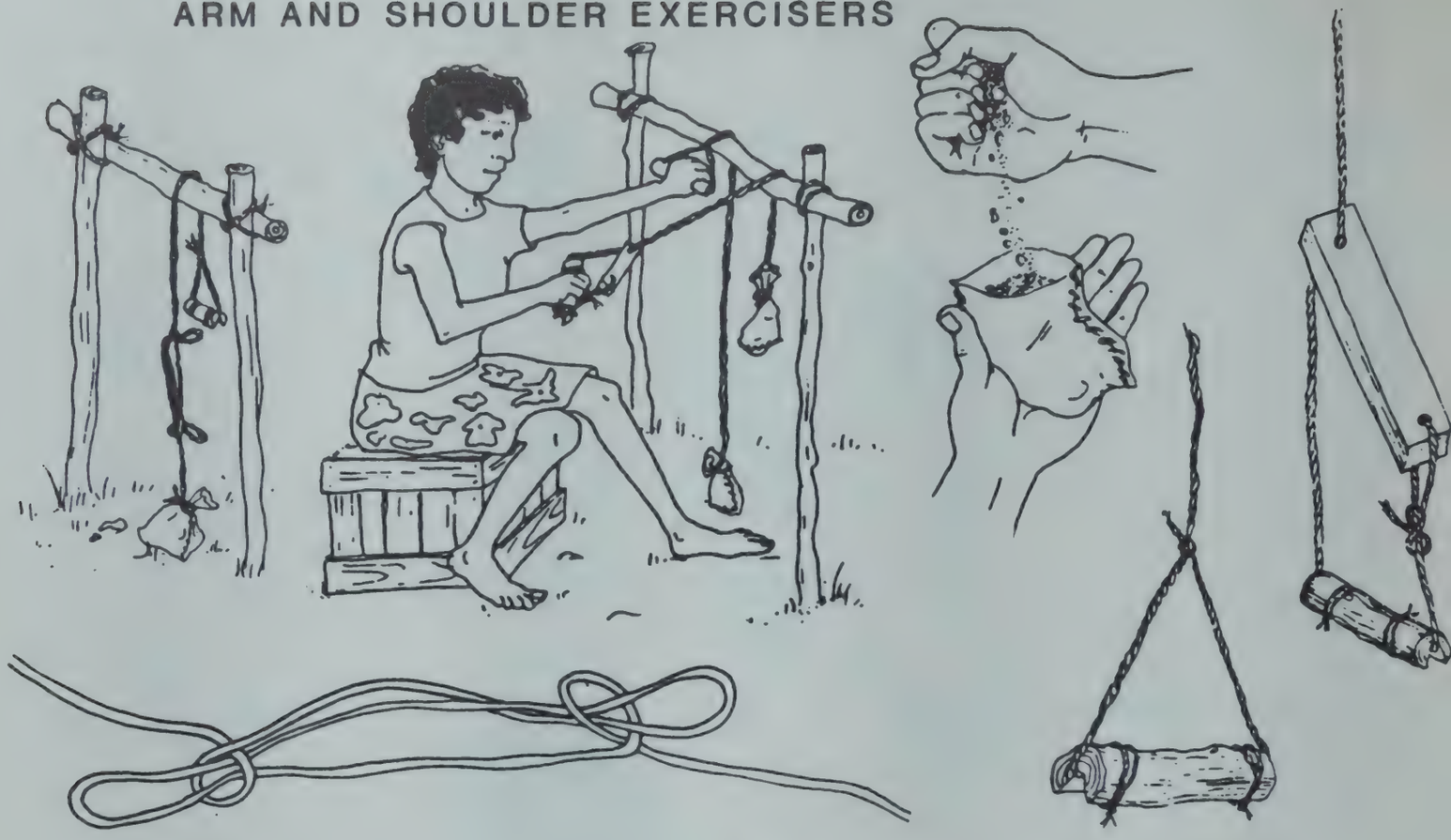
WEIGHTED ARM EXERCISER

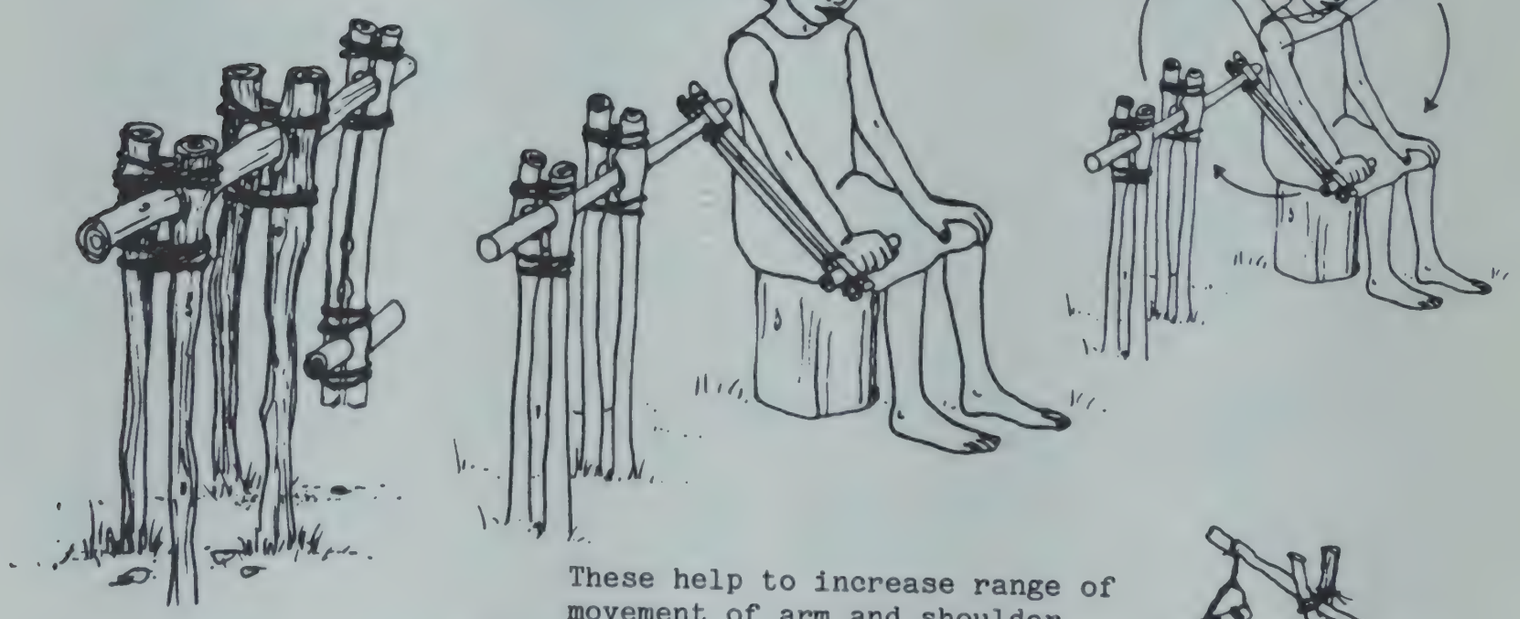
This exercises the arm as well as improves the power of the hand grip.

This helps to improve movements of arm, elbow and hand.

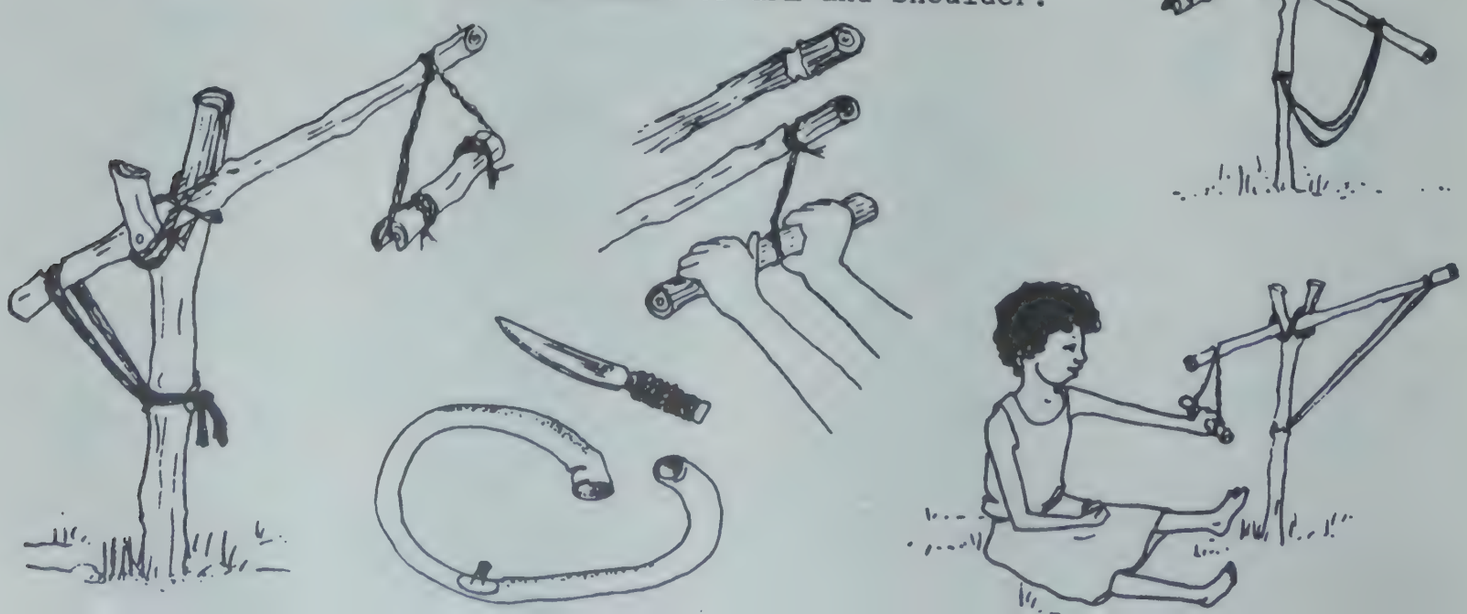


ARM AND SHOULDER EXERCISERS



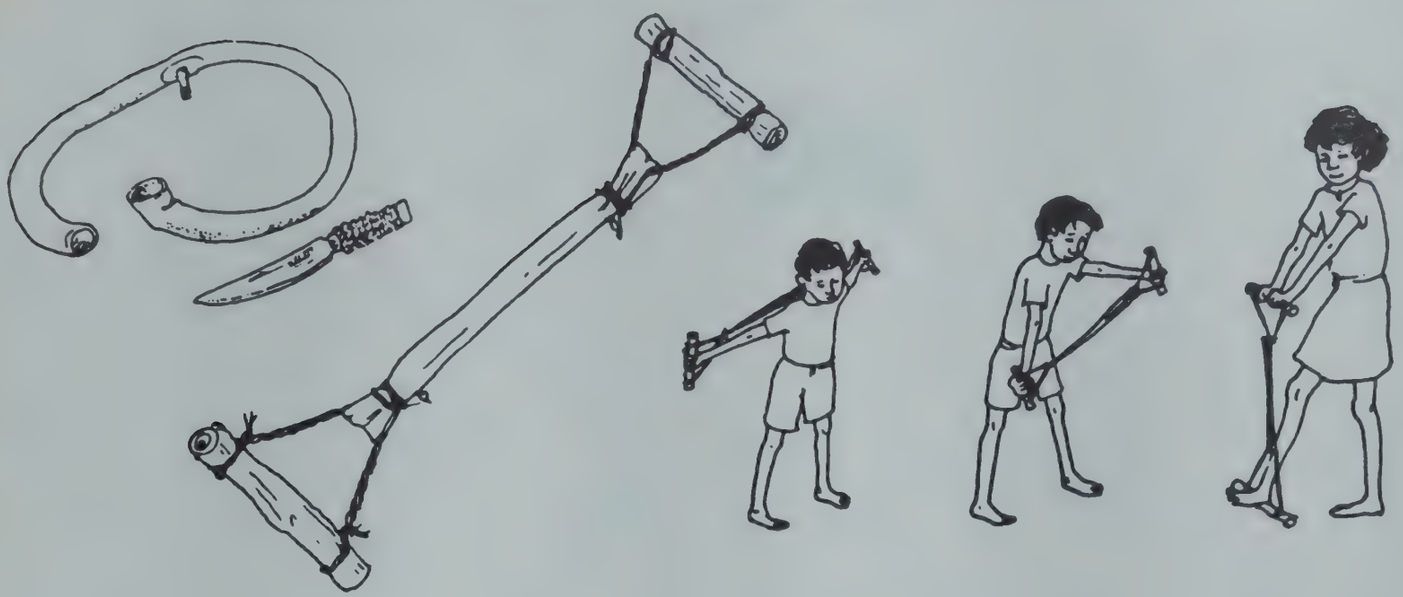


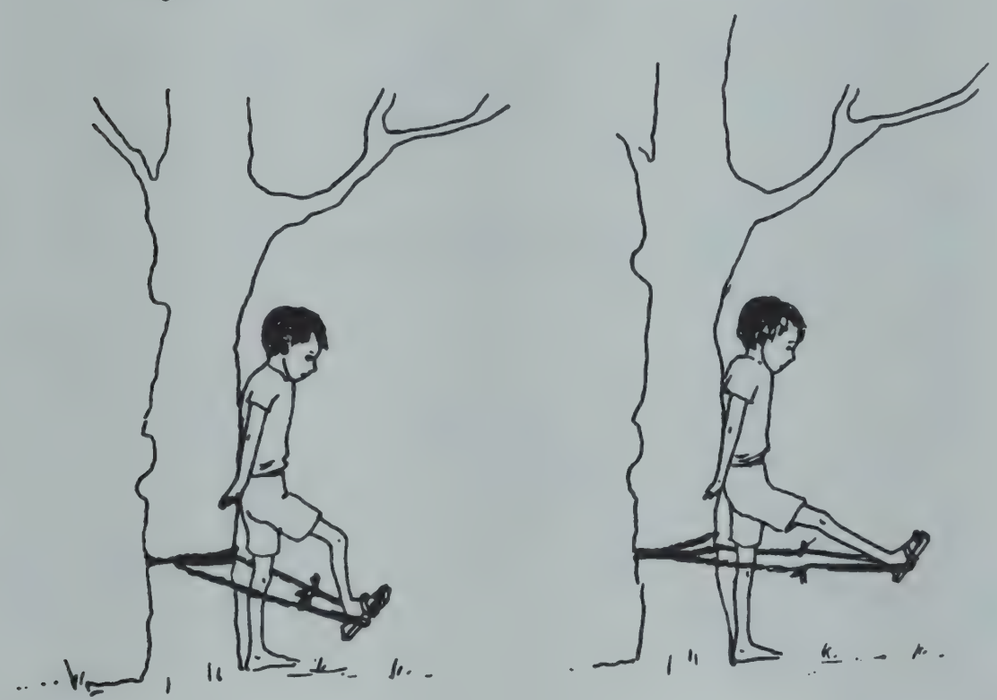
These help to increase range of movement of arm and shoulder.

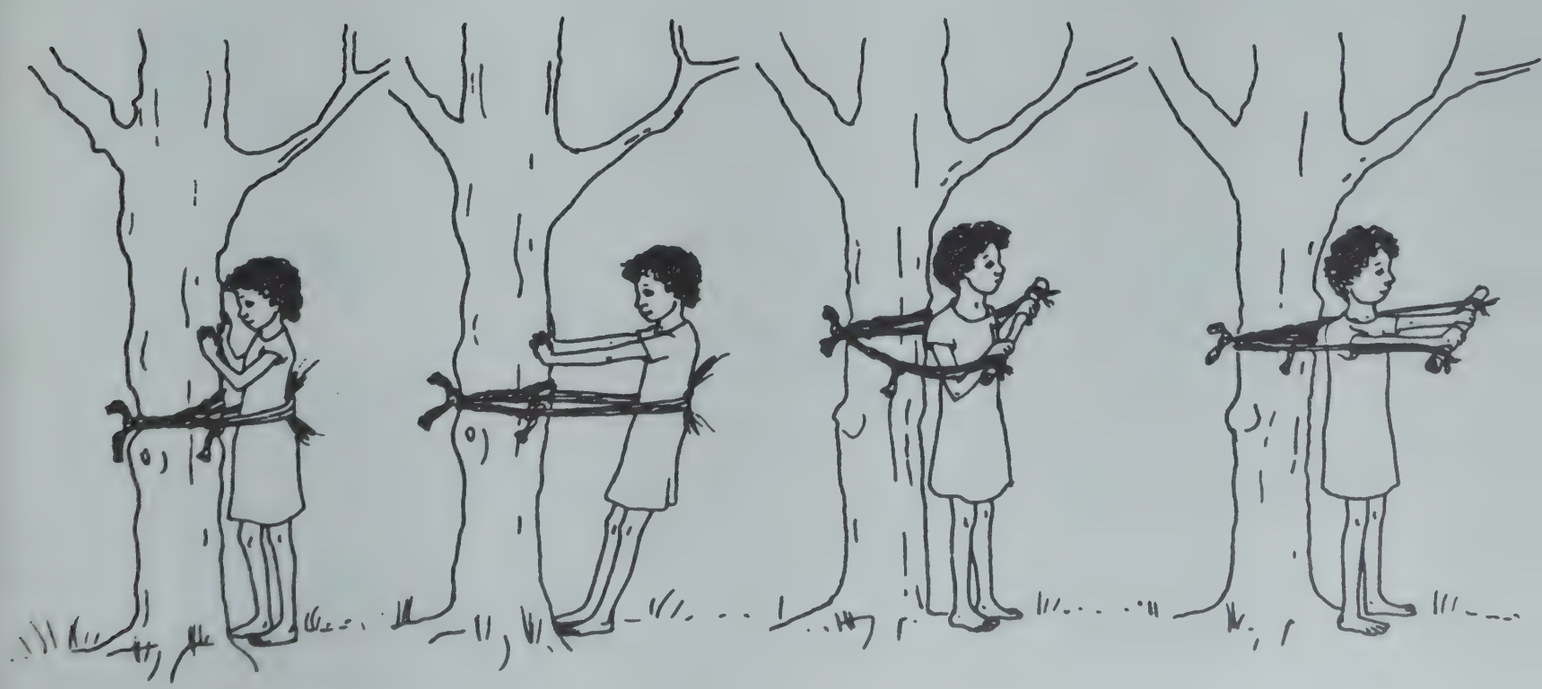


ARM AND LEG EXERCISERS

This helps to improve range and strength of arms and legs.



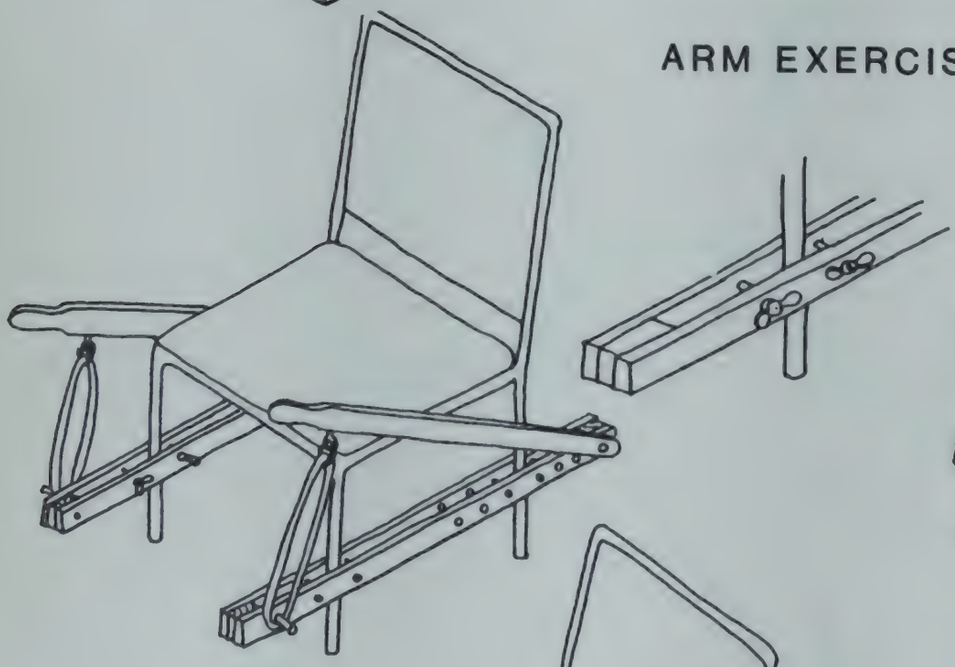


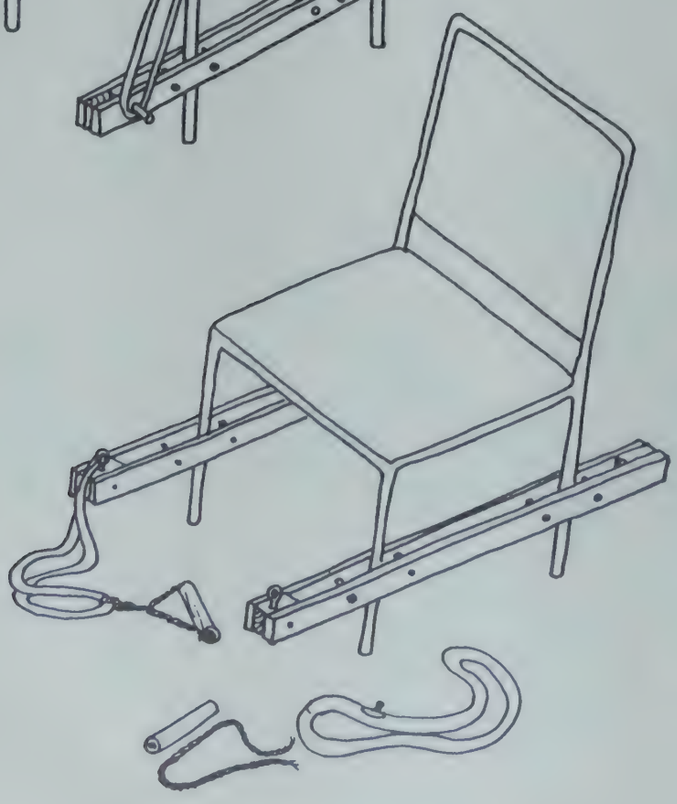


ARM AND LEG EXERCISER

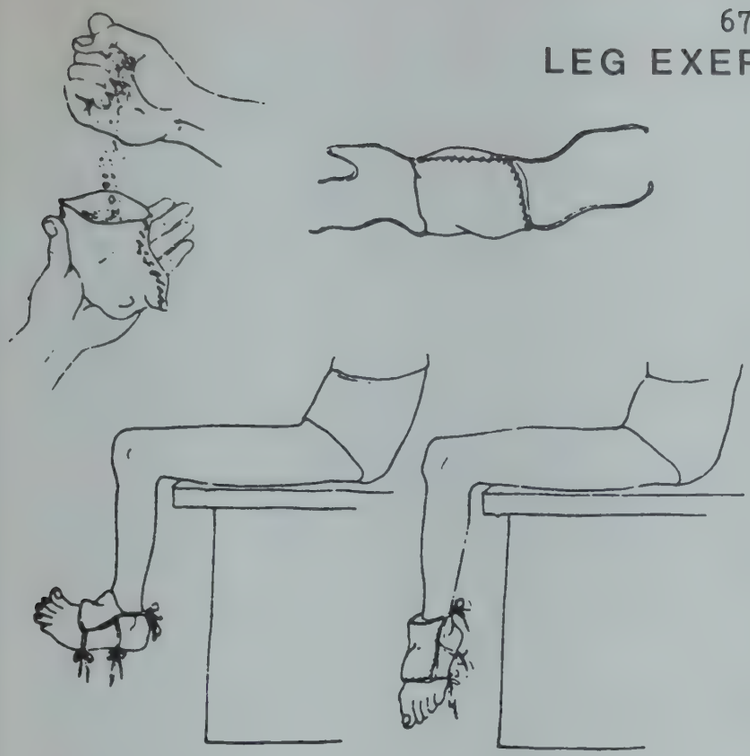
Bicycle pedals can be used if preferred.

ARM EXERCISERS

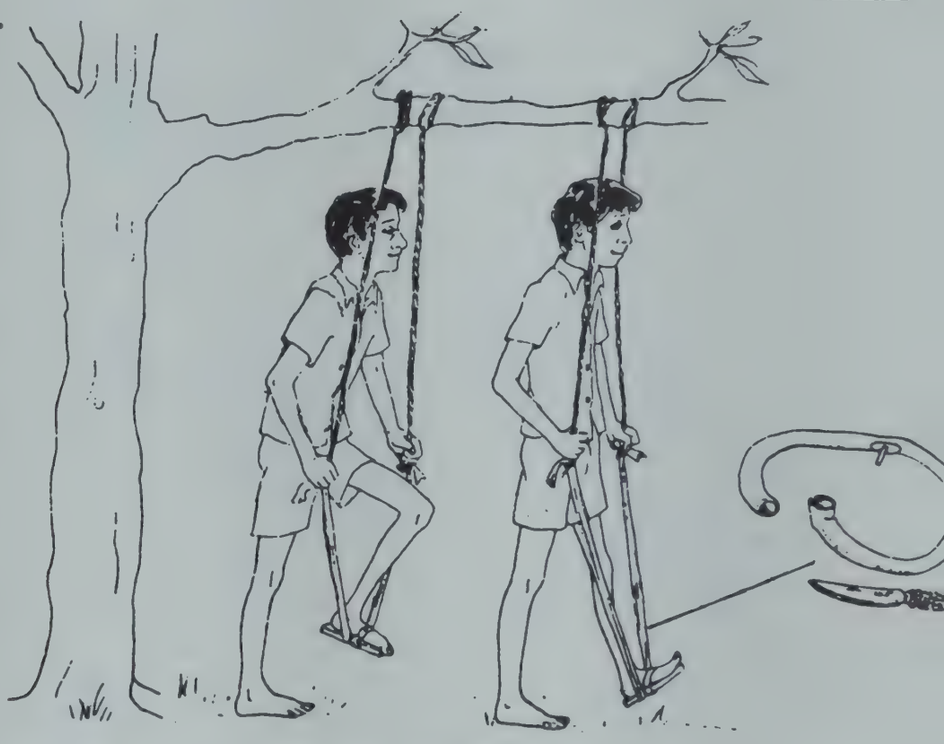




LEG EXERCISERS



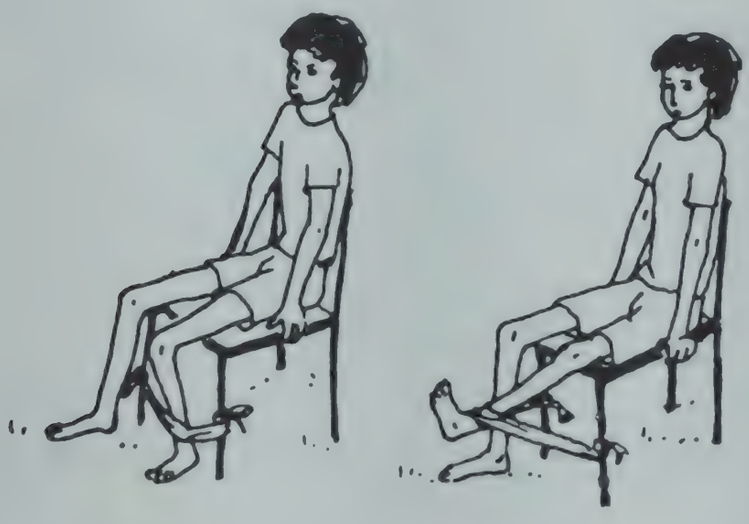
This helps strengthen the knee.
Increase the weight gradually.

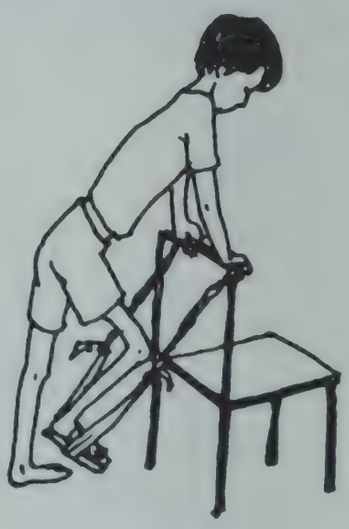


This helps to increase muscle power in hip, knee and ankle.

LEG EXERCISERS

This helps to improve muscle power and range of movement of hip and knee.

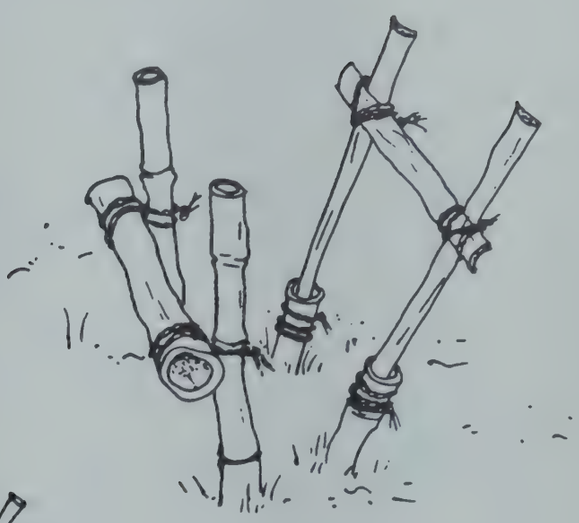


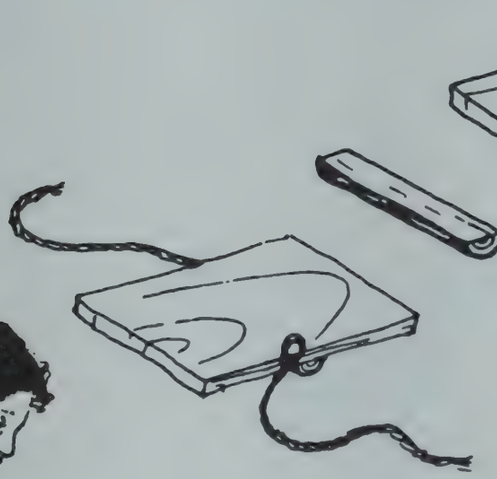


This helps strengthen hip, knee, ankle and foot.

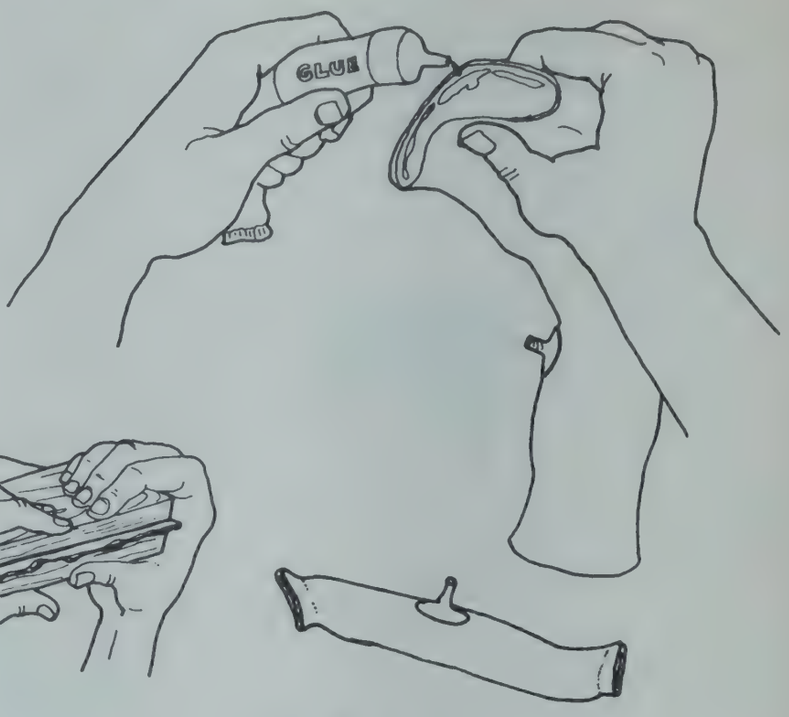
FOOT EXERCISERS

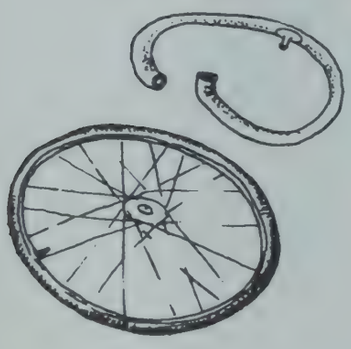
This helps to increase range of movement of ankle joint.

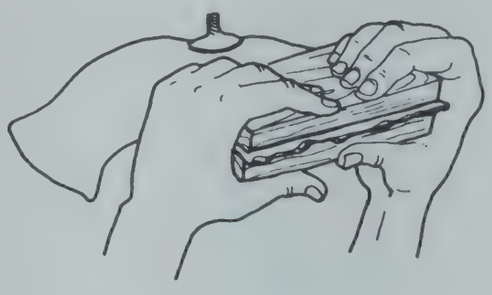




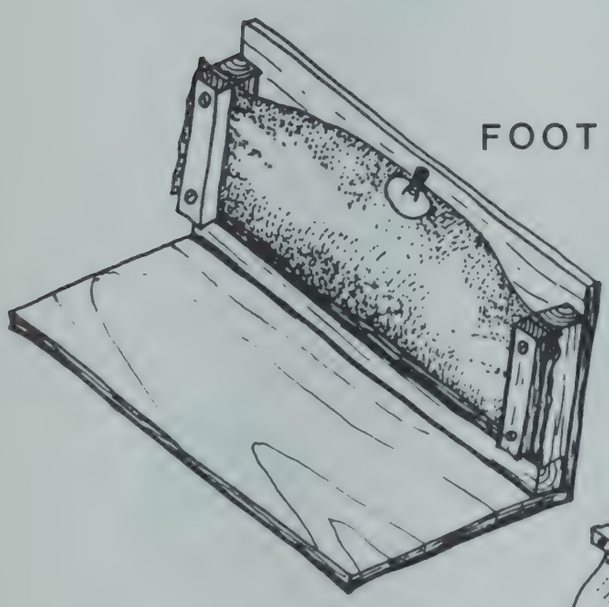
use of tyre inner tubes and rubber glue

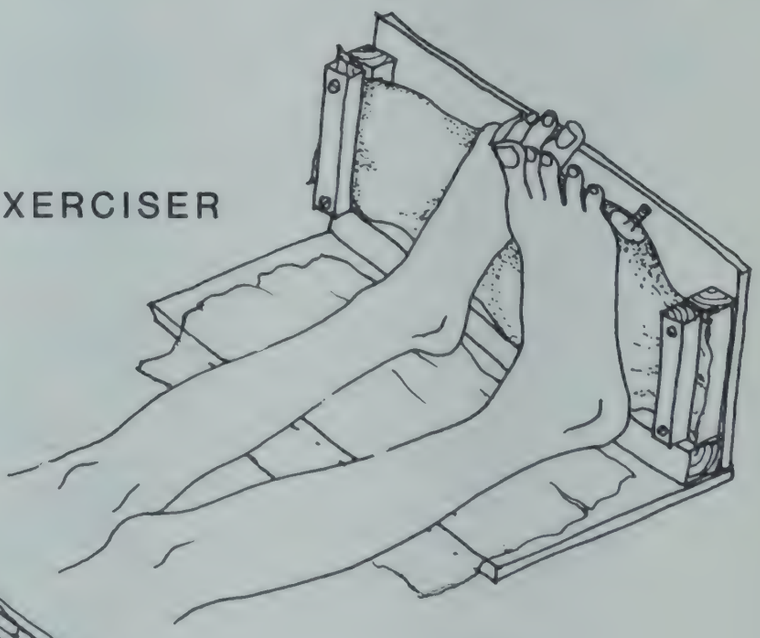


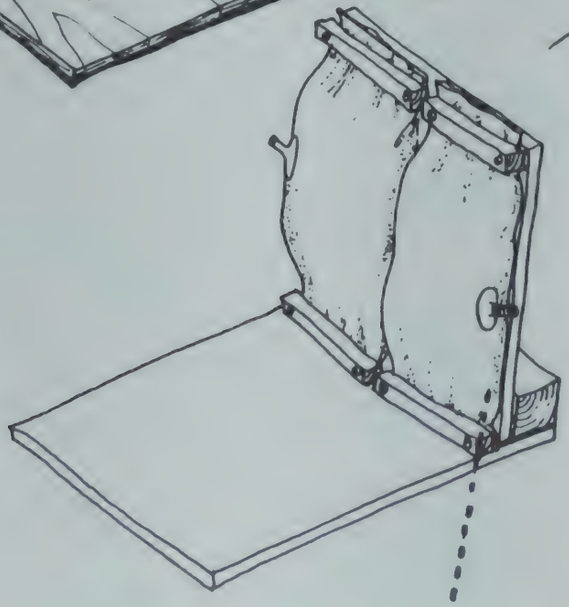




FOOT EXERCISER

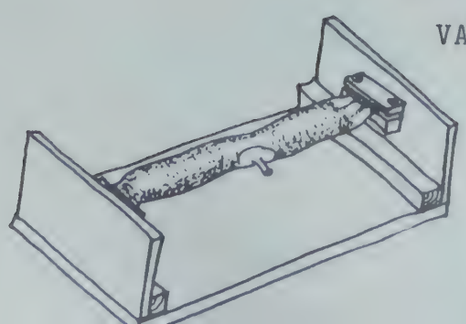


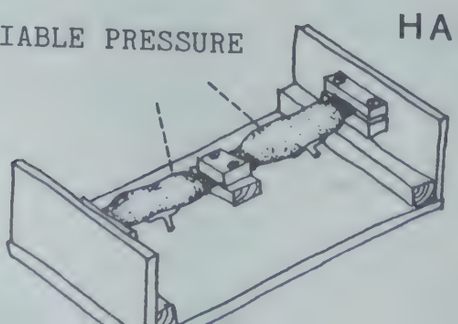


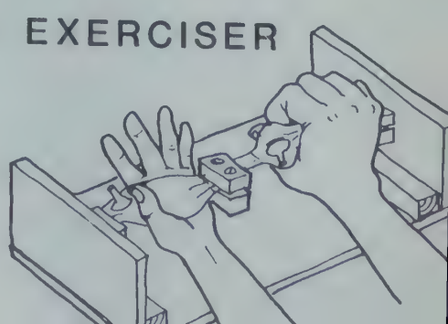


VARIABLE PRESSURE

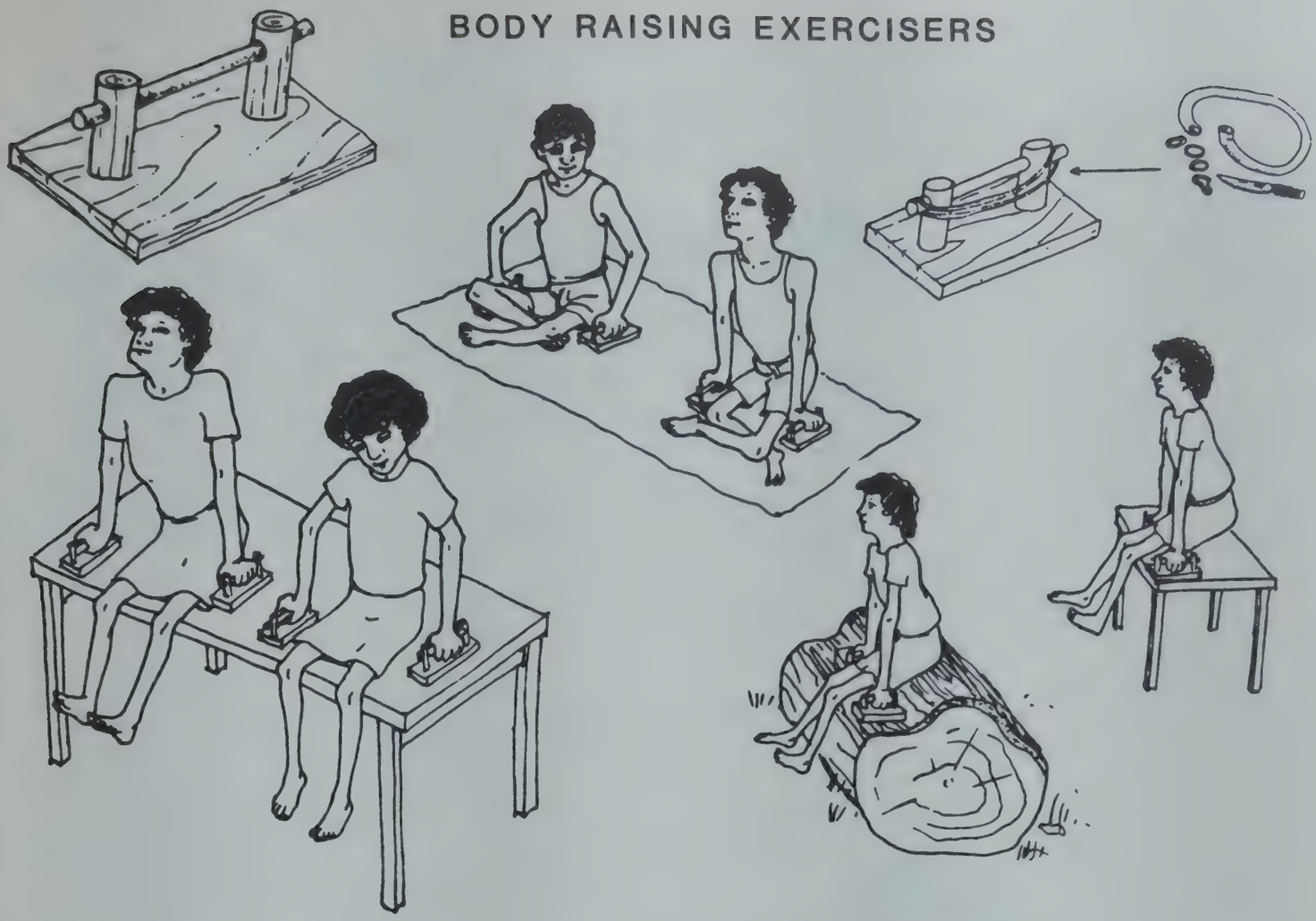
HAND EXERCISER





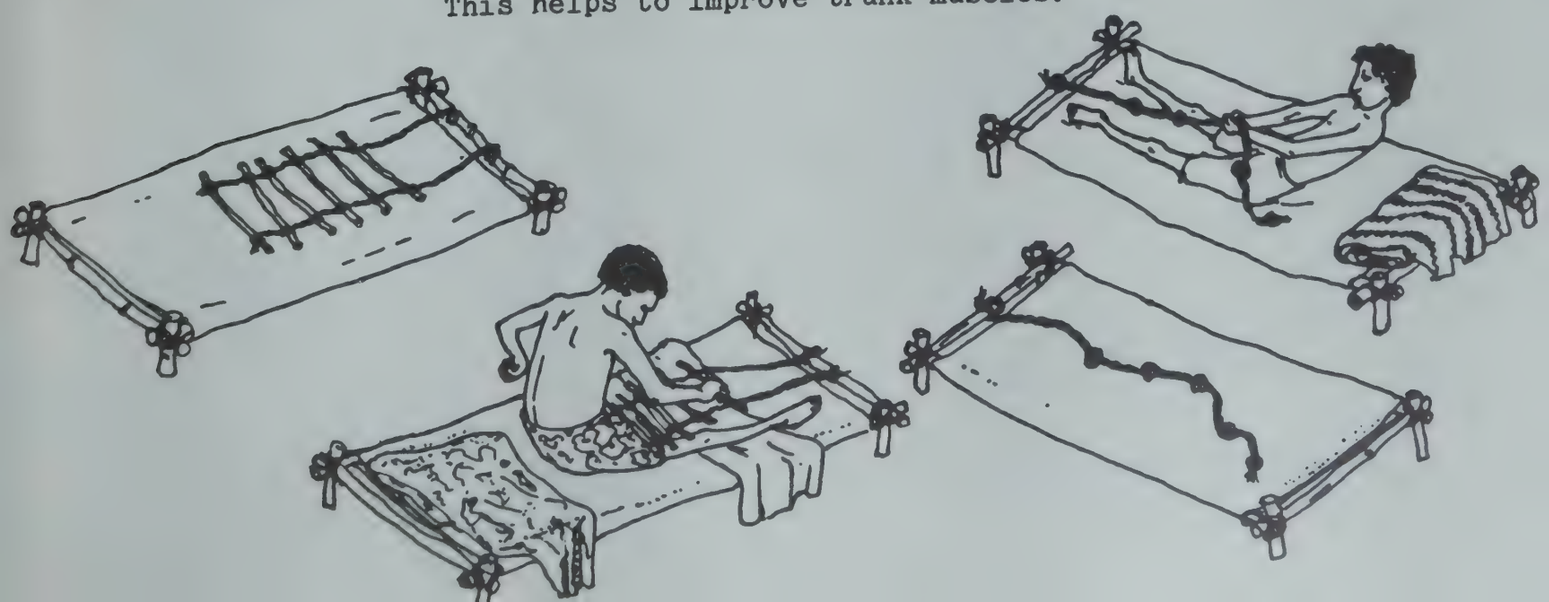


BODY RAISING EXERCISERS



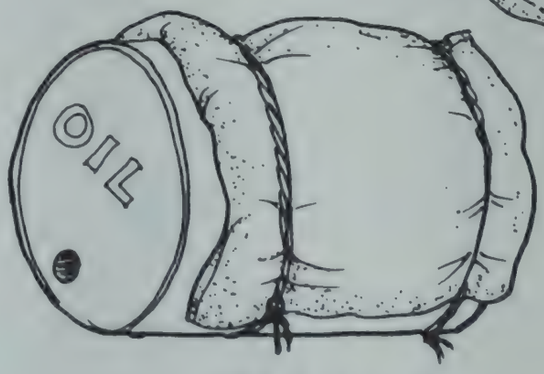
This helps to improve arm and trunk muscles.
It is especially useful for those who are going to use crutches or a wheelchair.

This helps to improve trunk muscles.



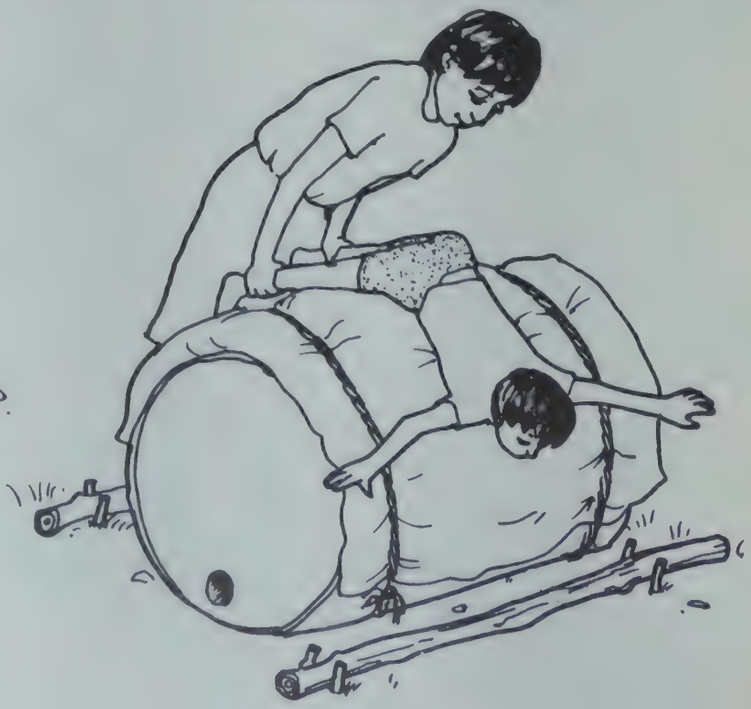
INNER TUBE TRAMPOLINE

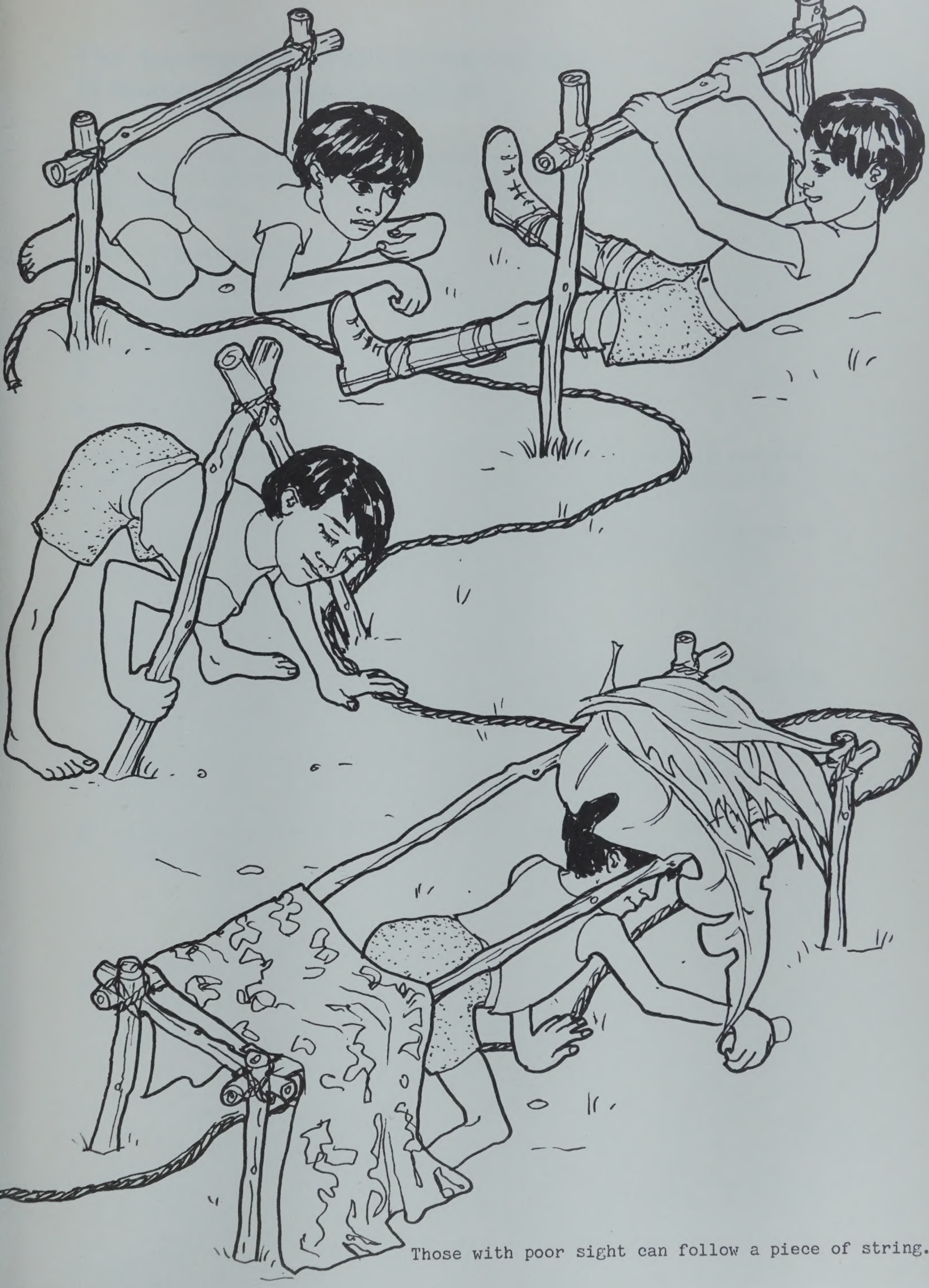
Stop the holes in the cloth from tearing by extra cloth or leather reinforcement.



BARREL FORM

ROCKER BALANCE





Those with poor sight can follow a piece of string.

The Appropriate Health Resources and Technologies Action Group Ltd.

AHRTAG's objective is to promote successful techniques in support of primary health care through its information service, training materials, and design and development of simple equipment.

Special areas of interest include:

- disability prevention and rehabilitation
- diarrhoeal diseases
- oral health
- lost cost packaging for essential drugs
- acute respiratory infections

Three times a year the Disability Unit at AHRTAG produces a newsletter Aids For Living, which concentrates on low-cost technologies, equipment and practices for prevention of disability and rehabilitation of disabled people.

Aids For Living is available free of charge to developing countries (a small charge of £5.00 ($10.00) is made to subscribers in developed countries), from AHRTAG, 85 Marylebone High Street, London W1M 3DE, UK.

Other Disability Unit publications include:

- Personal Transport for Disabled People (1984) 90pp
  incorporating successful designs for local manufacture of wheeled aids, including wheelchairs, trolleys and tricycles from all over the world.
  Price: £2.50 plus postage and packing
- Let Us Play and Move (forthcoming)
  a manual of play activities featuring Sophie Levitt's widely respected and innovative physiotherapy treatment for children.
- Manual on Appropriate and Low-Cost Below-Knee Artificial Limbs (forthcoming)

Other AHRTAG Publications:

- How to Choose and Make a Cold Box
  helps those working in immunisation programmes to choose and make the most appropriate cold boxes for vaccine transport in their area.
  Price: £3.00 plus postage and packing
- How to Look After a Health Centre Store
  provides basic guidelines for running a health centre medical store.
  Price: £3.00 plus postage and packing
- How to Look after a Refrigerator
  gives step by step instructions for the care and maintenance of kerosene, gas and electric refrigerators.
  Price: £2.00 plus postage and packing

These books are available from Teaching Aids at Low Cost (TALC), PO Box 49, St Albans, Herts, AL1 4AX, UK.

Postage and packing air speeded post add on 50% to the cost of the book.

Newsletters:

- Dialogue on Diarrhoea
  a quarterly newsletter concerned with all aspects of prevention and control of diarrhoeal disease. Available also in French, Spanish, Portuguese and Arabic.
- ARI News
  published three times a year, aiming to provide information about the causes of acute respiratory infections and approaches to prevention and control.

These newsletters are available free of charge to developing countries from AHRTAG.

Free Publications and Resource Lists:

- Disability Organisations in Asia, Africa and India.
- How to Make Hand Grips
  a poster showing how clay, plaster and epoxy resin putty can be used to make handgrips to allow disabled people to hold tools, spoons and brushes.
- The AHRTAG Baby Length Measurer
  working drawing for a simple, lightweight, baby length measurer which can be made from wood and taken apart for easy carrying.